

FLIGHT

First Aero Weekly in the World.

Founder and Editor : STANLEY SPOONER.

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.



THE pressing need of the moment is men, and yet more men. Men for the Army and Navy to fill the gaps caused by the terrific wastage of war and to maintain the fighting services at the standard required to prosecute the war to its successful conclusion. Men for munition factories, in order that our fighting troops may be able to depend upon an ever-increasing supply of the material aid to victory—shells and more shells. So far as concerns the supply of men for the Army, there are two ways in which the necessary numbers can be obtained. The one is by the raising of the age limit to 45, a step which is being very seriously contemplated by the Government, if, indeed, it has not already been decided upon. The second and much preferable method is by the process of "combing out," of which so much has been heard of late.

We have called this matter the more preferable, and advisably so. Regrettable as it may be from the point of view of a great many men of 45, there

is no doubt that in a war such as this the man of that age is not value for money. In individual cases he is, and more than value, but the individual case does not govern the principle that this is a young man's war and that the game as played now is essentially one for the young. That being so, it is obviously bad economy to take the men of 45 until the supply of the younger material has been exhausted. The principles being as stated, the question then arises: How is the supply of younger men to be obtained? To judge by the very large number of men of military age one sees in the streets and in public places generally, the men are here. The question is how they are to be made available. Many, of course, will automatically come into line when the tribunals deal with the final appeals. According to the latest available figures, nearly 400,000 temporary exemptions have been granted to eligible men, and in addition there are some 200,000 appeals pending. These figures give one to think that the meshes of the net are pretty large!

For one reason and another a very large proportion of the 600,000 will entirely escape military service. Probably no more than 150,000 will reach the fighting line. Manifestly, that figure is totally insufficient to the needs of the situation, and we must look elsewhere for our man-power. The Man-Power Distribution Board has reached a number of important decisions, which have been issued through the Press Bureau. In the *communiqué* the Board observes that the process of labour dilution has been very unequally carried out in different districts and in different works. That this is so is notorious. We believe we are quite within the bounds of strict accuracy in saying that in certain districts the amount of "dilution" does not exceed one per cent. of the labour employed. The Board is very strong on the necessity for proper dilution of labour, and goes so far as to say: "IT IS THE ONLY METHOD BY WHICH AN EXTENSION OF THE AGE FOR COMPULSORY SERVICE CAN BE AVOIDED."

Now, if the only way to secure the men without raising the age limit is by the dilution of labour, then the course is a perfectly obvious one—labour must be diluted in spite of the wail of the conscientious objector. We are fully conversant with all the arguments of the trade unions, who see in

"dilution" a deadly menace to their interests after the war. It might have been thought that the answer to that line of argument, that if we all stop to consider our immediate interests, there will be no "after the war" to concern us, would have been sufficient. Apparently, however, it is an answer that does not go all the way. But whatever the arguments for or against, the course is quite clear and must be taken.

We are fully alive to the supposed danger of the unskilled worker ousting the skilled later on. Even if there were as much as there is little in it, it would have to be disregarded, since there is only one thing that matters now, and that is to get on with the winning of the war by all and every means to hand. But when we come to examine what "dilution" really means in the way of danger as indicated, we find that there is surprisingly little in it. Take, for example, the case of a woman in a machine shop, engaged on munition work. She is doing the work of a skilled mechanic, or, to be correct, the work that under normal circumstances would be done by a skilled workman, which is not precisely the same thing. The mechanic, through years of training and experience, has become capable of carrying out *all* the processes that go to the machining and finishing of, say, an 18-pr. shell. The woman, on the other hand, has been taught to be proficient in *one* process only. She has become exceedingly deft at that, no doubt, but the fact remains that she is no more than a one-process worker, and cannot by any stretch of imagination be called "skilled" in the ordinary meaning of the term, and to a degree that would enable her to fill the place of a really skilled mechanic.

However, it is somewhat profitless at this period to waste time in the discussion of nice points. We are up against a clearly defined position, and it is for the whole nation to co-operate in the work that lies before us. The part of the loyal employer is to examine things so far as they affect his own particular business, with an eye to the discovery of how best he can serve his country's need. To come close home, there are some men at present employed even in our aircraft factories who, by process of judicious dilution, could be spared for service with the colours. As we have repeatedly in the past stated, we know that women have been imported into the industry in very large numbers, which is to say that it has been fairly well diluted already. But it is possible to carry the process much farther, and we appeal to the industry to take careful stock of the situation as it affects the individual firm, and to loyally respond to the appeal of the Board. It may well be that before the end comes we shall want the men of 45 and even older, but in the meantime, it is the younger men who are wanted, and whom we have to get, either by hook or by crook.

Honours for "Zeppelin Slayers."

A movement has been set on foot to confer the freedom of the City of London on the three airmen concerned in the bringing to earth recently of hostile airships engaged in raiding London. Let us hasten to say that we are in full accord with the

conferring of this honour on the three gallant young officers concerned. It is an entirely fitting reward that they should be made freemen of the City they have assisted so effectively to defend. We are able, too, to regard with satisfaction the announcement that several of the most important of the Provincial cities propose to follow suit, and to confer their freedom on airmen concerned in the destruction of hostile airships within their respective areas.

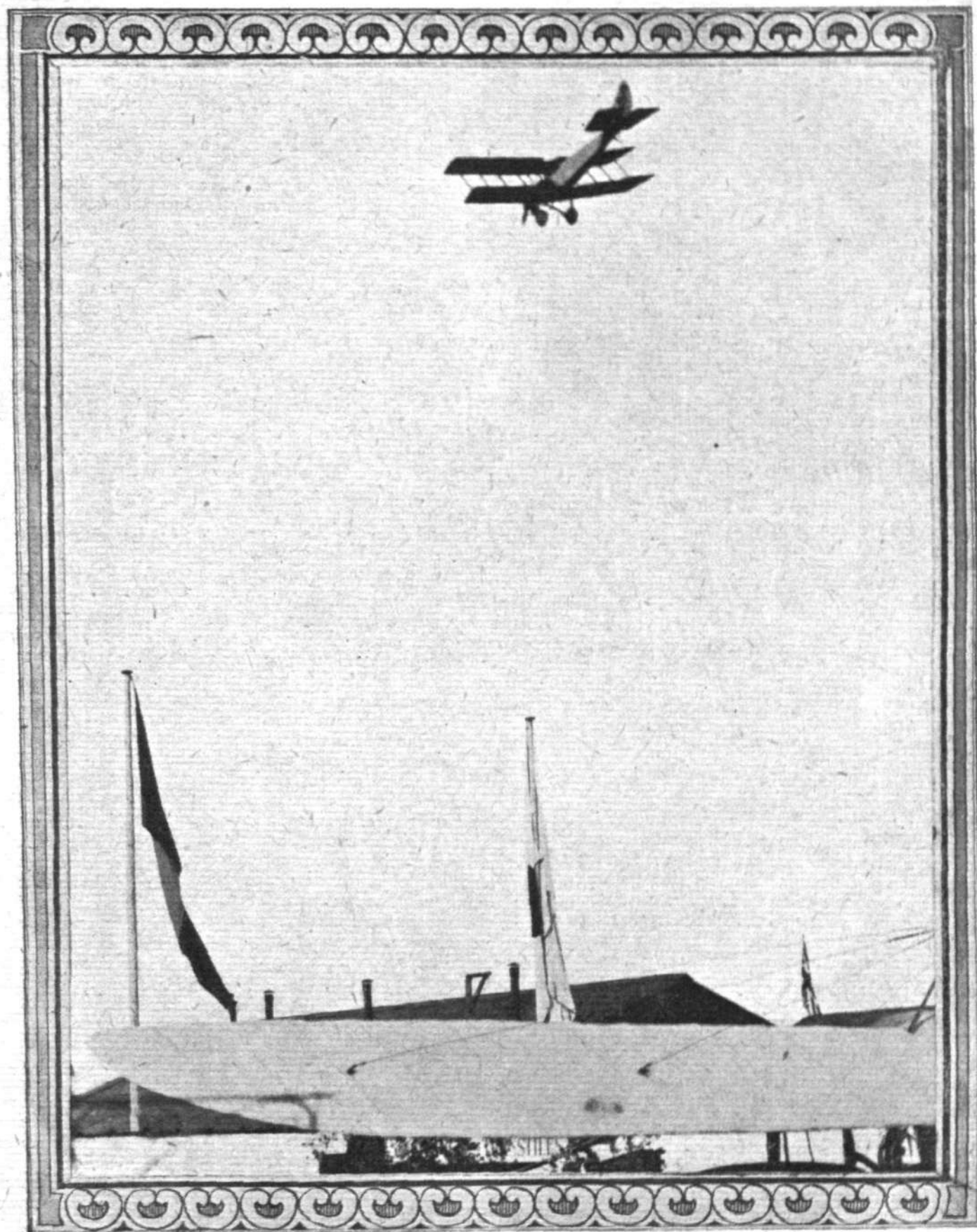
When we come, however, to the discussion in the public Press of the adequacy of official rewards, we are on more debatable ground. Certain of our daily contemporaries have seen fit to criticise the award of the D.S.O. to two officers of the R.F.C. for services in the direction noted, contrasting the award with the V.C. of Lieut. Robinson. One paper goes so far as to lay it down that the flying man who brings down a Zeppelin is in any case entitled to the supreme award of the V.C. We are not prepared to argue the respective cases. But we do deprecate the public discussion of such matters on the very defective premises available. The way in which we regard it is that the military authorities who were responsible for advising His Majesty of the proper awards in each case were cognisant of *all* the facts, and made their recommendations accordingly. We must be content to leave these matters to the proper and competent people. To discuss the adequacy or otherwise of awards made for gallant or distinguished service in the field is to cheapen such honours all round. We do not want our highest military decorations to fall to the level of the Iron Cross, which is what they inevitably must do if their award is to be dictated by the newspaper Press.

A Goodly Proportion.

A notable feature of the investiture held by His Majesty the King last week was the very large number of flying officers who received decorations. Of about 200 officers thus honoured, twenty belonged either to the R.N.A.S. or R.F.C. Ten per cent. is a goodly proportion indeed, and speaks far more loudly than mere words, of the brilliant services to the nation of the newest fighting arm. It is the more remarkable in that the flying service as a part of the scheme of military defence did not exist at all in its present form until but little more than five years ago. In February, 1911, the "Air Battalion" was constituted, with an equipment of five aeroplanes and three airships, one of which was ineffective. Now that arm has expanded into a force which has entirely altered the methods of war, and its *personnel* actually reaps such a large proportion of the awards for distinguished service in the field. Comment is entirely superfluous.

The Engaging Hum.

The best indication we have had so far that the Germans realise that the game is practically up for them is in the squealing of their Press. An example of the altered tone which has come over their newspaper articles is an editorial which recently appeared in one of the leading South German organs, the *Schwabischer Merkur*. The article in question is



AT HENDON AERODROME.—Mr. W. T. Warren, jun., on the L. and P. biplane returning to the 'drome after a looping-the-loop bout.

called, "Enemies all Round," and is apropos the entry of Roumania into the war. Here is an extract from this article which is eloquent of the state of the German mind:—

"We cudgel our brains, and cannot understand how it is possible that such devilish hatred has centred against us Germans, even in places where we, in our good-naturedness, would have looked for friendship. We long for the time when we are again allowed to speak our minds in the Press—not about the division of the war booty, for that is premature—but about the means to gain the victory, the uses of our U boats and Zeppelins, and whether, as some maintain, it is still possible to come to an understanding with England."

Why they should be reduced to the cudgelling of brains over so simple a proposition as this, passes comprehension. Passing over such matters as air raids on undefended towns and villages; the sinking of defenceless passenger ships, with the incidental murder of inoffensive civilians, all of which it might conceivably be argued are likely to produce a military effect, the German can be answered out of his own mouth. As we have said, though the acts we have quoted have justly met with the abhorrent disapprobation of the whole civilised world, it is open to the Germans to raise the defence that the killing of non-combatants is regrettable, but is nevertheless an inevitable accompaniment of war. That, we know, is in effect the defence they *have* raised. But what is to be said of their latest addition to the amenities of war? In consequence of the successful air raids carried out by the Allies on Zeppelin and aeroplane sheds near Brussels, the engaging Hun now places prominent citizens of Brussels within those sheds in the hope that by so doing they will prevent the Allies from attacking them. That is one of the reasons—or it should rather be said that it is the state of mind and feeling that prompts such action, that makes the very name of German stink in the nostrils of the world. No need for the gentle Hun to cudgel his brains about the matter. The smallest amount of introspection should supply him with ample reasons for the unutterable dislike with which he is regarded.

A British Trade Bank.

Lord Faringdon's Committee, which was appointed by the Government to investigate the problems of trade finance after the war, has issued its report with praiseworthy promptitude. That Report is of surpassing interest to the British business man, since it recognises what has been felt by the business community for years, that the existing banking facilities

are by no means adequate to the needs of modern commerce.

We have grown used to the spectacle of the man with a thoroughly sound business proposition, without money enough of his own to finance it through, begging here and there for the necessary capital, often without success, and as often able only to secure it on the least advantageous terms. It is wide of the mark to say—as we have heard it said—that no sound business scheme need fail for want of money. Theoretically this may be so, but in practice we have all known the contrary. The history of the aviation industry will supply more than one instance, to go no farther, for our illustration. Under the present banking scheme, the joint stock banks will only advance money against securities that can be locked up in the safe, as it were. The best of commercial undertakings are apt to be turned empty away when they have nothing but "futures" to talk about.

In that respect our financial system has lagged far behind that of Germany, where industrial banks exist for the express purpose of financing sound businesses. It is this gap that the Report of Lord Faringdon's Committee—composed mainly of bankers—proposes to bridge over by the creation of a Trade Bank, under Royal Charter and with a capital of £10,000,000, the first issue to be from 2½ to 3 millions sterling.

With the full terms of the Report we are scarcely concerned here. What is of interest is the recognition of the principle that legitimate industry requires up-to-date methods of finance if we are to regain and retain our commercial supremacy after the war. Undoubtedly, such a Trade Bank as that suggested in the Report would go far towards removing one of the most serious handicaps of commerce. The Report might go farther than it does in the direction of arranging for the financing of internal trade. So far as it is possible to discern, the Committee's recommendations are confined to the financing of businesses doing an "overseas" trade. To our way of thinking, if we are to hold our own in the protection of *all* our markets—including those at home—arrangements will have to be made for the assistance of certain trades and industries which are not directly concerned with an overseas trade. We are not by any means criticising the Report of the Committee. This is admirable and goes much farther than anyone would have expected. But we do suggest that once the principle of industrial banking meets with acceptance, the way is open for a much wider field of activity than is foreshadowed in the Report under discussion.

The Wright Patents.

THERE seems to have been some amount of misapprehension in the minds of the Press and public in the matter of the Wright patents. In the course of his Wilbur Wright Memorial Lecture before the Aeronautical Society of Great Britain in June last, Mr. Griffith Brewer made the position clear, as we thought. He stated definitely that the British Wright Co. had compounded its rights—past, present and future—in consideration of a lump sum of £15,000, so far as concerned machines for the Army or the Navy, which, in Mr. Brewer's own words, "is, in fact, the only real market for aeroplanes in Great Britain." That the British Wright Co. was likely to go to the trouble and expense of renewing patents to exploit a market which, in its own view, does not exist, would not to the ordinary intelligence seem likely. The facts of the position were clearly defined in "FLIGHT" of October 16th, 1914, at the time the action against the

Government was settled as stated above. At the same time, perhaps it is just as well for the enlightening of the "man in the street" for Mr. Griffith Brewer to be still more explicit, and, in his own words, "call a spade a spade," and thereby dispel any doubt there might exist by reason of his statement at the Wilbur Wright Lecture being "too Balfourian."

Lighting and Public Safety.

To the regulations under the Defence of the Realm Act conferring power on the authorities to require the extinguishment of lights, the following addition has been made:—

"Any such order as aforesaid may contain directions as to public lamps being lighted or kept lighted, and if any public lamp is not lighted or kept lighted as required by the order, any person having control of the lamp for the time being shall be guilty of a summary offence against these regulations."

The British Air Service

— PER ARDUA AD ASTRA —

Under this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

Admiralty, October 4th.

Leading Mech. D. R. Douglas, Air-Mech. 1st Grade A. R. Willmott, Petty Officer Mechs. W. G. Parry and T. H. Levett, and J. M. Burnett, W. F. Dickson, G. A. Edwards, J. P. Everitt, E. S. Dean, R. V. Britwell and P. C. Richards entered as Proby. Flight Officers for temp. service, all to date Oct. 8th. V. Rhead entered as Temp. Warrant Officer, 2nd Grade, to date Oct. 9th.

Admiralty, October 5th.

Temp. Sub-Lieut. (R.N.V.R.) C. B. Orfeur, appointed to the "President" for R.N.A.S., to date Oct. 8th.

Messrs. E. McD. Wright and J. H. W. Clarke entered as Proby. Flight Officer (temp.), and appointed to the "President" for R.N.A.S., to date Oct. 15th and 8th respectively.

Admiralty, October 7th.

Asst. Paymr. (R.N.R.) F. H. Wakeford entered as Proby. Flight Officer, for temp. service, to date Oct. 6th.

Admiralty, October 9th.

The following Temp. Lieuts. (R.N.V.R.) promoted to Temp. Lieut.-Com. (R.N.V.R.), all with seniority Oct. 5th: L. H. Strain, D.S.C., H. Ingram, C. F. Steele, B. O. Jenkins, W. Park, D.S.C., C. F. Jenkin, C. Kirby, W. A. Briston, F. W. Hodges and F. S. Pilling.

G. H. Childs, P. Swain and A. J. Dronsfield granted temp. commissions as Lieuts. (R.N.V.R.), and appointed to the "President," for R.N.A.S., to date Oct. 7th.

The under-mentioned Temp. Sub-Lieuts. promoted to Temp. Lieut. (R.N.V.R.), all with seniority Oct. 5th: W. H. Reid, G. Gude, R. V. B. Loxley, R. D. Seddon, V. H. Ride-wood, H. I. Dear, N. Sladden, D. E. Garnett, A. J. Currie, H. L. Crowther, G. Hindle, C. L. Robinson, A. J. Dreydel, R. A. Allport, C. Horsfield, H. M. Beddall, R. R. Alexander, R. M. N. Perks, F. W. Mansell, E. D. Galloway, C. Lightfoot, J. P. Bourke, H. W. Blake, F. J. Dean, A. T. Lee, D. L. Gillmore, S. T. Baker, F. W. Hill, J. M. Burke, H. Foord, A. Scarrisbrick, F. Smythe, H. C. Mallett, E. H. Bellew, C. G. More, E. C. W. Fitzherbert and J. A. Macnab.

S. Thomas and F. W. R. Martino granted temp. commissions as Sub-Lieut. (R.N.V.R.), and appointed to the "President," additional, for R.N.A.S., to date Oct. 7th.

A. J. Guzner and C. J. Clayton entered as Proby. Flight Sub-Lieuts., for temp. service, and appointed to the "President," additional, for R.N.A.S., to date Sept. 3rd.

Royal Flying Corps (Military Wing).

London Gazette, October 3rd.

Flight-Commander.—Temp. Lieut. J. F. Johnson, Gen. List, from a Balloon Officer, and to be Temp. Capt. whilst so employed; Sept. 13th, 1916.

Equipment Officer.—Temp. 2nd Lieut. E. L. Taylor, Gen. List, from an Asst. Equipment Officer, and to be Temp. Capt. whilst so employed; Aug. 1st, 1916.

Flying Officers.—2nd Lieut. J. F. A. Day, Spec. Res.; Aug. 17th, 1916. Temp. 2nd Lieut. J. L. Trollope, Gen. List; Sept. 2nd, 1916. 2nd Lieut. A. B. Drewery, Spec. Res.; Sept. 4th, 1916. Sept. 5th, 1916: Capt. H. A. Hill, Ind. Army; Temp. Capt. G. Taylor-Loban, Durh. L.I., and to be transferred to the Gen. List; Temp. 2nd Lieut. W. G. Nicholls, E. Surr. R., and to be transferred to the Gen. List; 2nd Lieut. V. R. Stewart, A.S.C. Sept. 6th, 1916: Temp. 2nd Lieut. J. P. Alexander, R. Scots, and to be transferred to the Gen. List; 2nd Lieut. H. D. Crompton, W. Lan. Brig., R.F.A. (T.F.); Temp. 2nd Lieut. R. T. Barlow, Gen. List; 2nd Lieut. P. G. Robinson, Spec. Res. 2nd Lieut. G. Barrett, Spec. Res.; Sept. 7th, 1916. Flying Officers (Ob.) who have graduated as Pilots, and been appointed Flying Officers in previous *Gazettes* will take their places on the list of Flying Officer, with effect from the date of their appointment as Flying Officers (Ob.).

Flying Officers (Observers).—April 5th, 1916: Lieut. N. W. Stewart, 7th R. Scots (T.F.); 2nd Lieut. E. King, 3rd K.O.

Sco. Bord., Spec. Res., and to be seconded. Sept. 9th, 1916. Temp. Capt. W. H. de W. Waller, A.S.C., and to be transferred to the Gen. List; Temp. Lieut. H. J. Duncan, R.A., and to be transferred to the Gen. List; 2nd Lieut. G. E. Godsave, Lond. R. (T.F.); Temp. 2nd Lieut. E. V. Pemberton, R.A., and to be transferred to the Gen. List. Sept. 11th, 1916: 2nd Lieut. (Temp. Lieut.) R. Spiers, Soc. Rif. (T.F.); 2nd Lieut. (Temp. Lieut.) C. S. Workman, Soc. Rif. (T.F.); Temp. Lieut. R. S. S. Ingram, W. Rid. R., and to be transferred to the General List; Temp. 2nd Lieut. C. Street, Ches. R., and to be transferred to the Gen. List. Sept. 16th, 1916: 2nd Lieut. R. G. R. Allen, W. York. R. (T.F.); Temp. 2nd Lieut. R. Stephenson, Army Cyclist Corps, and to be transferred to the Gen. List; Temp. 2nd Lieut. G. H. Wood, Gen. List.

Assistant Equipment Officer.—Temp. 2nd Lieut. E. E. Castle, Gen. List; April 30th, 1916.

Supplementary to Regular Corps.—The under-mentioned 2nd Lieuts. (on prob.) resign their commissions:—Oct. 4th, 1916: A. G. Stewart, J. J. Dunne, W. L. Winstanley. 2nd Lieut. (on prob.) G. L. Main is confirmed in his rank. The under-mentioned to be 2nd Lieuts. (on prob.): W. F. J. Matthews; Aug. 24th, 1916. Sept. 3rd, 1916: F. J. S. F.



Second Lieut. Sowrey, D.S.O. (on the right), who has received his decoration for recent Zepp. strafing. On the left is Lieut. Robinson, V.C., who brought down the Cuffley airship; and in the centre is Capt. F. R. Stammer.

Feast, J. H. G. Wilson, T. M. Wilson, H. I. Allen, C. E. Oxendale, S. S. Kaye, R. Berl, D. A. Pearson, L. B. Crough and R. G. Watts; Sept. 4th, 1916.

London Gazette Supplement, October 4th.

*Experimental Officer (graded as an Equipment Officer).—*Capt. R. B. Bourdillon, Spec. Res., from a Flying Officer; June 9th, 1916. (Substituted for the notification in the Gazette of Sept. 13th, 1916.)

Flying Officers.—June 21st, 1916: 2nd Lieut. (Temp. Lieut.) W. E. Grosset, Highland Cyclist Bn. (T.F.); 2nd Lieut. (on prob.) E. A. McKay, Spec. Res. Major E. H. M. O'Farrell, R. Ir. Fus., from a Flying Officer (Ob.); June 28th, 1916, with seniority from Oct. 21st, 1915. Temp. 2nd Lieut. J. L. Tibbetts, Gen. List; Sept. 7th, 1916. Temp. 2nd Lieut. G. H. Raitt, Gen. List; Sept. 9th, 1916. Sept. 10th, 1916: 2nd Lieut. A. Rice-Oxley, Shrops. L.I. (T.F.); 2nd Lieut. J. P. C. Mitchell, High. L.I., Spec. Res., and to be sec'd.; 2nd Lieut. (on prob.) T. Hayes, Spec. Res. Temp. 2nd Lieut. N. R. Pomeroy, Gen. List; Sept. 11th, 1916. Sept. 12th, 1916: 2nd Lieut. G. J. H. Lascelles, S. Mid. (Glouc.) Brig., R.F.A. (T.F.); 2nd Lieut. W. S. Caster, Hunts Cyclist Bn. (T.F.), from a Flying Officer (Ob.), with seniority from April 1st, 1916; Temp. 2nd Lieut. A. J. Fisher, Gen. List; Temp. 2nd Lieut. L. B. Solomon, Gen. List. 2nd Lieut. (on prob.) H. S. Lees-Smith, Spec. Res.; Sept. 13th, 1916. 2nd Lieut. (on prob.) J. S. Mitchell, Spec. Res.; Sept. 14th, 1916.

Memoranda.—1st Class Air-Mech. H. S. Wilkins, from R.F.C., to be Temp. 2nd Lieut. for duty with the Military Wing of that Corps; Aug. 4th, 1916. The under-mentioned to be Temp. 2nd Lieuts. for duty with R.F.C.:—Sept. 1st, 1916: Chief Petty Officer J. L. Greener, from R.N.V.R.; Pte. F. B. Stevens, from 1st Suss. Yeo. (T.F.); Pte. W. E. Wright, from Inns of Court O.T.C.; Sept. 9th, 1916.

London Gazette Supplement, October 5th.

Squadron Commander.—Capt. H. Wyllie, Wilts. R., from a Flight-Commander, to be sec'd., and to be Temp. Major whilst so employed; Sept. 1st, 1916. (Substituted for the notification in the Gazette of Sept. 25th, 1916.)

Parh Commander.—Temp. Capt. F. W. K. Davies, A.S.C., to be transferred to Gen. List, and to be Temp. Major whilst so employed; Sept. 20th, 1916.

Flight-Commander.—2nd Lieut. (on prob.) R. J. Hudson, R. Fus., Spec. Res., from a Flying Officer, and to be Temp. Capt. whilst so employed; Aug. 9th, 1916.

Flying Officers.—2nd Lieut. (on prob.) W. S. Frackleton, Spec. Res.; Aug. 30th, 1916. 2nd Lieut. (on prob.) W. T. B. Tasker, Spec. Res.; Sept. 3rd, 1916. Temp. 2nd Lieut. W. J. Stonier, Bedf. R.; Sept. 5th, 1916. Lieut. J. C. F. Owen, Canadian A.S.C.; Sept. 6th, 1916. Sept. 7th, 1916: 2nd Lieut. P. F. Heppell, Northumbrian Brig., R.F.A. (T.F.); 2nd Lieut. H. J. Finer, Home Counties Divl. R.E. (T.F.); 2nd Lieut. (on prob.) M. J. Fenwick, Spec. Res.; Temp. 2nd Lieut. V. B. Allen, Gen. List; Temp. 2nd Lieut. G. H. Cock, Gen. List; Temp. 2nd Lieut. C. E. Ward, Gen. List. Sept. 11th, 1916: Temp. 2nd Lieut. O. J. Wade, R. W. Kent R., and to be transferred to the Gen. List; 2nd Lieut. (on prob.) G. H. Lee, Spec. Res.

Supplementary to Regular Corps.—2nd Lieut. (on prob.) W. H. Douche resigns his commission; Oct. 6th, 1916. The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank:—F. H. Gay, B. James, R. W. Cross, R. G. Fordham, G. W. Dampier, W. M. Kent, N. B. Lovemore, T. A. B. Rolfe, G. H. Foley. The under-mentioned to be 2nd Lieuts. (on prob.): A. L. Challis; Aug. 22nd, 1916. Aug. 27th, 1916: E. M. Leete, R. M. Ward. Aug. 31st, 1916: L. Davies, J. W. Parkinson. L. M. Van Eyssen; Sept. 1st, 1916. H. Fuller-Clark; Sept. 3rd, 1916. G. W. Longstaff; Sept. 10th, 1916. J. R. Taverner; Sept. 18th, 1916. R. L. Lyster-Smythe; Sept. 25th, 1916.

London Gazette, October 6th.

Equipment Officer.—The rank of 2nd Lieut. E. L. Taylor, Gen. List, is as now described, and not as in the Gazette of Oct. 3rd, 1916.

Experimental Officer (graded as an Equipment Officer).—The date of appointment of Lieut. (Temp. Capt.) B. M. Jones, R.E. (T.F.), is June 9th, 1916, and not as in the Gazette of Sept. 13th, 1916.

Flying Officers.—July 3rd, 1916: 2nd Lieut. (on prob.) E. R. Yates, Spec. Res.; 2nd Lieut. (on prob.) E. D. Spicer, Spec. Res.; 2nd Lieut. H. A. Hallam, York. and Lanc. R., Spec. Res., and to be sec'd.; Sept. 13th, 1916. Sept. 14th,

1916: Temp. Lieut. N. W. Wickham, R. Lanc. R., and to be transferred to Gen. List; Temp. 2nd Lieut. H. R. Davies, R.E., Spec. Res.; 2nd Lieut. H. W. Girdlestone, R.A., and to be sec'd.; 2nd Lieut. G. H. Foley, Spec. Res.; 2nd Lieut. (on prob.) W. D. Thom, Spec. Res. Sept. 15th, 1916: Capt. D. V. J. Blake, Australian Flying Corps; 2nd Lieut. (on prob.) J. V. A. Gleed, Spec. Res.; 2nd Lieut. R. W. Cross, Spec. Res. Sept. 16th, 1916: Capt. H. J. Segrave, Wilts. R., and to remain sec'd.; 2nd Lieut. R. G. Fordham, Spec. Res. 2nd Lieut. (Temp. Lieut.) A. H. Orlebar, Beds. R. (T.F.); Sept. 17th, 1916. The appointment of Temp. 2nd Lieut. P. W. M. Orme, notified in the Gazette of Aug. 24th, 1916, is antedated to June 18th, 1916.

Assistant Equipment Officers.—July 10th, 1916: 2nd Lieut. E. J. Street, 2nd Lieut. H. Jones, 2nd Lieut. J. H. Winch. (Substituted for the notification in the Gazette of Aug. 8th, 1916.) 2nd Lieut. W. Park, Spec. Res.; Sept. 4th, 1916.

Memorandum.—Feb. 14th, 1915: 2nd Lieut. (on prob.) A. Roberts, from R.F.C., Spec. Res., to be Temp. 2nd Lieut. on Gen. List, for duty with R.F.C.; Aug. 15th, 1916.

Supplementary to Regular Corps.—The appointment of 2nd Lieut. (on probation) L. F. Bennett, notified in the Gazette of July 27th, 1916, is antedated to June 21st, 1916. The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: M. J. Fenwick, W. S. Frackleton, J. S. Mitchell, G. H. Lee, W. T. B. Tasker, C. E. Blayney, S. W. Taylor, C. H. Vincent, J. D. Stodart, H. Thompson, F. H. Sanders, F. G. Seabrooke, R. T. Vernon, T. Hayes, C. J. Pender, A. J. McWha, H. B. Burrell, C. Elphinstone, H. J. Whittingham, P. Young. W. Park to be 2nd Lieut.; Sept. 4th, 1916. The under-mentioned to be 2nd Lieuts. (on prob.): W. P. Bingham; Sept. 1st, 1916. F. H. Postlethwaite; Sept. 9th, 1916.

London Gazette Supplement, October 7th.

The under-mentioned N.C.Os. and men to be Temp. 2nd Lieuts. (on prob.), for duty with R.F.C.: Pte. J. Phillips, from A.S.C.; Aug. 31st, 1916. Sept. 3rd, 1916: Sergt. W. J. Reid, from A.S.C.; Corpl. C. H. Blakeway, from R.F.C. Pte. J. H. McLennan, from Can. Inf.; Sept. 6th, 1916. Corpl. C. E. Wilson, from Lond. R.; Sept. 7th, 1916.

Flight-Commander.—Capt. G. Disney, Essex R.; Sept. 25th, 1916, but with seniority from June 1st, 1916.

Flying Officers.—2nd Lieut. C. R. Keary, N. Staff. R., and to be seconded; Sept. 15th, 1916. Sept. 16th, 1916: Temp. 2nd Lieut. (Temp. Lieut.) J. L. M. de C. Hughes-Chamberlain, Gen. List, from a Flying Officer (Ob.), with seniority from May 6th, 1916; Temp. 2nd Lieut. N. F. W. Rockey, Gen. List; Temp. 2nd Lieut. A. Denison, R. W. Surr. R., and to be transferred to Gen. List; 2nd Lieut. W. A. M. Niven, Spec. Res. Sept. 17th, 1916: Lieut. F. V. Woodman, Canadian Gen. List, from a Flying Officer (Ob.), with seniority from April 1st, 1916; 2nd Lieut. R. S. Larkin, Spec. Res. 2nd Lieut. F. H. Gay, Spec. Res.; Sept. 18th, 1916.

Assistant Equipment Officers.—Sept. 4th, 1916: 2nd Lieuts., Spec. Res.: R. J. Cowan, C. H. Boyle, R. A. Hassard. Temp. 2nd Lieut. L. H. Aston, Gen. List.

Memoranda.—The under-mentioned to be Temp. 2nd Lieuts. for duty with R.F.C.: Chief Petty Officer L. H. Aston, from R.N.A.S.; Aug. 7th, 1916. Staff-Sergt. F. Green, from N.Z. Exped. Force; Sept. 25th, 1916. The under-mentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: L.-Corpl. G. M. J. Denman, from R. Suss. R. (T.F.); Aug. 28th, 1916. L.-Corpl. J. Wingate, from Herts. Yeo. (T.F.); Aug. 31st, 1916. Pte. D. M. Mackie, from Inns of Courts O.T.C.; Sept. 11th, 1916. Sept. 24th, 1916: Pte. B. O. Butler, from Canadian A.S.C.; Regtl. Qr.-Mr.-Sergt. E. H. Hooper, from 3rd Co. of Lond. Yeo. (T.F.); Sergt. A. L. Johnson, from Lond. Elect. Engrs., R.E. (T.F.). The under-mentioned, from R.F.C., to be Temp. 2nd Lieut. (on prob.) for duty with the Military Wing of that Corps: Flight-Sergt. H. Dear; Sept. 24th, 1916. 1st Class Air-Mech. W. G. Ruggins; Oct. 1st, 1916.

Supplementary to Regular Units or Corps.

Royal Flying Corps, Military Wing.—2nd Lieut. (on prob.) W. S. Roberts is dismissed the Service by sentence of a General Court-Martial; Sept. 16th, 1916. The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: G. L. Rodwell, W. A. M. Niven, R. S. Larkin, J. E. Histed, N. E. S. Simon, W. D. Thom, J. V. A. Gleed, P. H. Smith, N. H. Read, H. E. Martin, E. D. Spicer, J. R. Hembrough. The under-mentioned to be 2nd Lieuts. (on prob.): H. J. Taplin; Aug. 17th, 1916. A. D. Robertson; Aug. 27th,

1916. H. E. Jarman; Sept. 24th, 1916. H. B. D. Grazebrook; Sept. 24th, 1916.

London Gazette Supplement, October 9th.

Flying Officers.—Sept. 13th, 1916: Lieut. G. C. Rogers, Canadian Gen. List; Lieut. R. G. Macnaughton, R. Highrs. (T.F.), from a Flying Officer (Ob.), with seniority from May 26th, 1916; 2nd Lieut. (on prob.) J. H. Broadway, Dorset R., Spec. Res., and to be sec'd. Sept. 15th, 1916: Temp. 2nd Lieut. D. E. Hood, Bedf. R., and to be transferred to Gen. List; Temp. 2nd Lieut. G. R. A. Deacon, R. Suss. R., and to be transferred to Gen. List; 2nd Lieut. E. A. Clark, Spec. Res. Temp. 2nd Lieut. J. H. O. Jones, Gen. List; Sept. 16th, 1916. 2nd Lieut. J. E. Histed, Spec. Res.; Sept. 17th, 1916. Sept. 18th, 1916: Temp. Lieut. L. Dodson, S. Staff. R., and to be transferred to Gen. List; 2nd Lieut. C. L. Roberts, S. Lan. R., Spec. Res., and to be sec'd.; 2nd Lieut. E. Elgey, W. Rid. Brig., R.F.A. (T.F.); 2nd Lieut. H. E. Martin, Spec. Res.

Memoranda.—The under-mentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: Sergt. A. L. Pearce, from 1st Mounted Divl. Sigl. Sqdn., R.E. (T.F.); Sept. 11th, 1916. Corpl. R. C. Carline, from a Training Res. Bn., Middx.

R.; Sept. 16th, 1916. Corpl. F. J. Cunningham, from Canadian Red Cross Hosp.; Sept. 17th, 1916. Sept. 24th, 1916: L.-Corpl. H. News, from A.S.C.; L.-Corpl. C. H. Stafford, from Berks. Yeo. (T.F.); Pte. G. G. Onions, from A.S.C.; Sept. 30th, 1916.

Supplement to Regular Corps.—The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: E. A. Clark, M. A. Chappell, T. G. Mackenzie, A. C. Hartley, R. P. C. Freemantle, F. E. Hobley, D. W. Wilson, H. G. Welsford, A. W. Payne, F. M. Howard, D. Smith, E. E. Glorney, I. G. Poole-Warren, J. N. Stephens. The under-mentioned to be 2nd Lieuts. (on prob.): A. E. Biggs, A. W. Barlow; Aug. 31st, 1916. H. J. G. Dyer; Sept. 10th, 1916. Sept. 17th, 1916: C. H. Stevens, A. Graham. Sept. 18th, 1916; R. N. Vyvyan, H. C. Sharp. B. V. N. Rowcroft; Sept. 21st, 1916. R. G. Whitcomb, G. E. Quincey, W. D. Scott; Sept. 30th, 1916.

Kite Balloon School of Instruction.

London Gazette Supplement, October 7th.

Commandant (graded as a Squadron Commander).—Temp. Capt. A. H. Parker, Gen. List, from a Flight Commander, vice Capt. G. Disney, Essex R.; Sept. 25th, 1916.

THE FLYING SERVICES FUND—Administered by THE ROYAL AERO CLUB.

The Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to Oct. 3rd, 1916..	10,853	11	7
Collected at the Westland Aircraft Works,			
Yeovil (Fifty-first contribution)	0	14	10

Total, October 10th, 1916	10,854	6	5
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166, Piccadilly, W. B. STEVENSON, Assistant Secretary.



(Official photo. issued by the Press Bureau.)
HUT LAND, ON THE FRONT IN FRANCE.—An observation balloon going up.

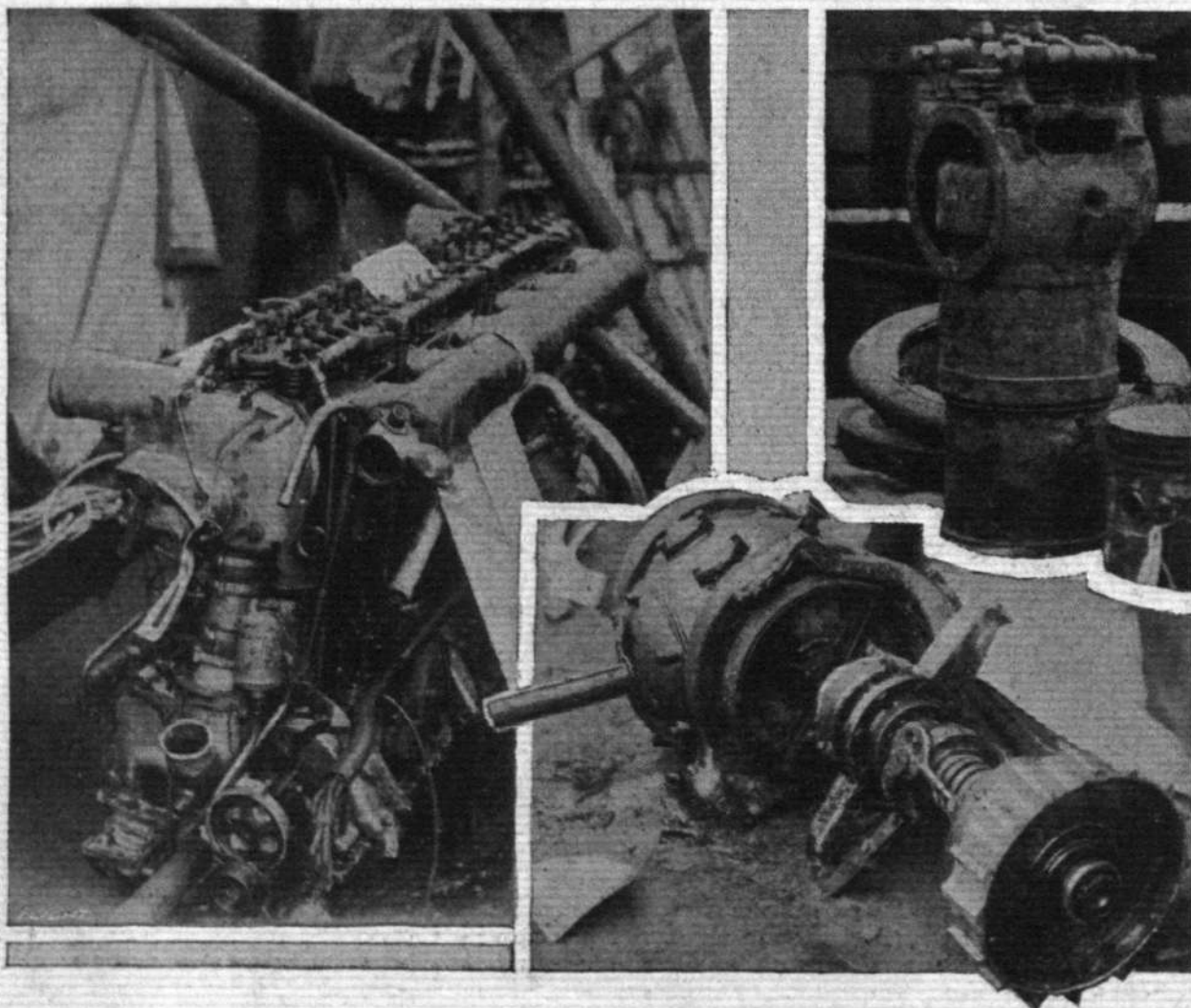
THE HUN RELICS AT THE H.A.C.

If Germany had made up her mind in the early days to give the Schütte-Lanz firm the same encouragement as was accorded the aged Count Zeppelin, it is highly probable that we in this country should now know a great deal less about German airship construction than we do, for whatever may be said for and against the two forms of construction, there can be no doubt that the Schütte-Lanz method has this great advantage, from the German point of view, that when brought down in flames little of any practical value is left to give information calculated to be of use to the enemy. Such items as engines, gondolas, propellers with their transmission, &c., are generally not battered beyond recognition, but of the main framework hardly enough is left wherewith to start a fair sized kitchen fire, let alone form any decided opinion of size and shape. Not so with the Zeppelin type of airship. Except for the fact that building a replica entails making a complete set of working drawings, there is no reason why we should not now be able to start work immediately on a similar craft were we so minded. When three airships of practically the same type have come to grief it requires extraordinarily bad luck for the same part to get smashed up in all three wrecks, and by taking the uninjured, or nearly so, parts of one and combining them with the intact portions of the other two, there is really not a great deal that eludes detection.

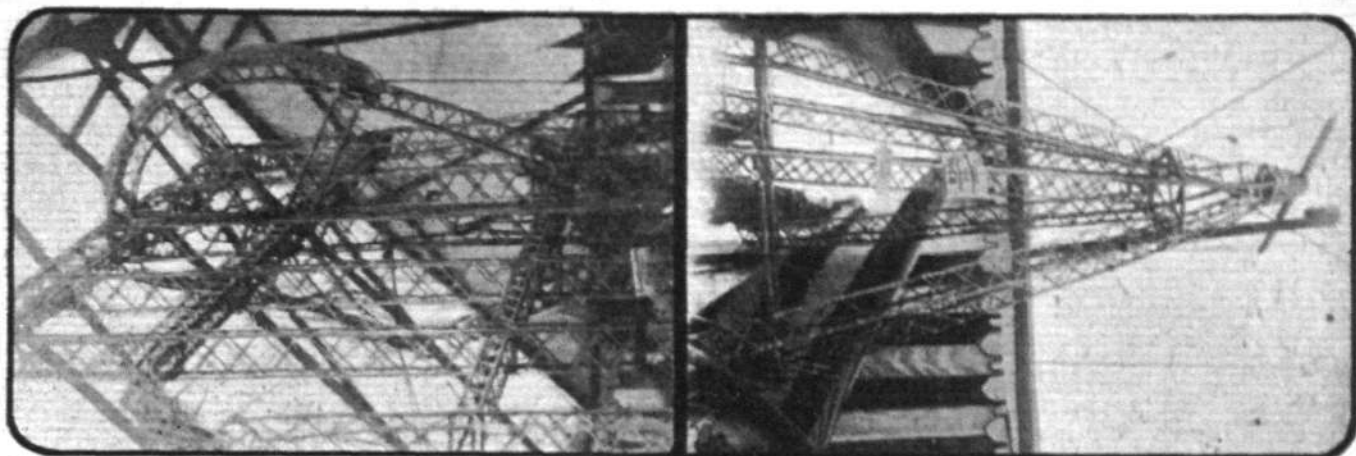
Although only a small portion of the wreckage of the Zepp. brought down in flames in Essex is shown at the H.A.C. grounds, Finsbury Pavement, a very good idea may be formed, from these only, of the general method of construction followed in the building of a modern rigid airship. One of the first things noticed when examining the various girders is, that instead of the old method of building up a

beam which consisted chiefly in alternating vertical and sloping pieces connecting the flanges of the beam, the X formation is now almost entirely employed. Generally speaking three types of beams appear to be employed, according to the work to be done at that particular place. For the heavier stresses a rectangular section beam is used, built up of four L section *longerons* connected with crossed members, as shown in the accompanying sketches. For the heaviest kinds of work it appears that the web pieces cross one another twice, although only one of the intersections is used for attaching the two parts of the cross to one another. The second way of joining the ends of the crosses to the flanges is that of only partly crossing the ends in such a manner that one rivet secures two members to the flange, each member being, in addition, fastened to the flange with another rivet. The sketches, which were made from memory and which do not lay claim to being more than diagram, will, however, serve much better to give an idea of the construction than is possible in a written description. The third type of girder referred to is built up similarly to the others, with the exception that this is of triangular instead of rectangular section. These are used towards the stern of the airship, a conical portion of which was shown.

Generally speaking, an inspection of the fragments gives one the impression that all the smaller component parts of the beams have been standardised as far as possible, and are, in fact, stampings turned out by the thousands. By far the most expensive operation in the construction is the assembling and erecting, which must be a lengthy process even with latest riveting machinery. Each individual beam seems to have been very well thought out and constructed, but when it comes to putting two members such as—to use

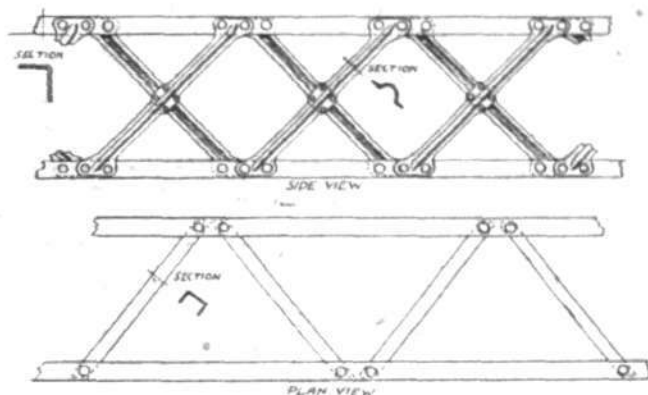


One of the six-cyl. engines, and in the separate photos, a clutch and a single cylinder, detached from one of the other engines.



ZEPPELIN CONSTRUCTION.—On the left the framework of an elevator, and on the right the conically shaped tail of the girder structure. When on exhibition the latter was upended, but we have placed it as it would be were the airship cruising.

terms known from aeroplane construction—formers and stringers together, this appears to have been left to the workmen to do as best they might, some doing it one way and some another. The locking together of the various beams

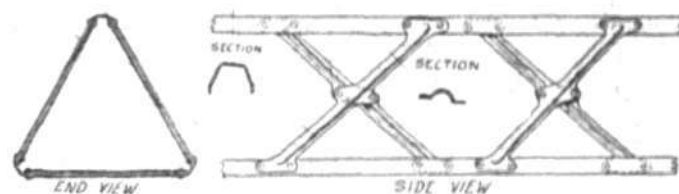


ZEPPELIN GIRDER CONSTRUCTION.—For the heavier loads beams of rectangular section are employed. Also the riveting is slightly different.

where they meet or cross others appears exceedingly clumsy, and shows no trace of clever design. In connection with the

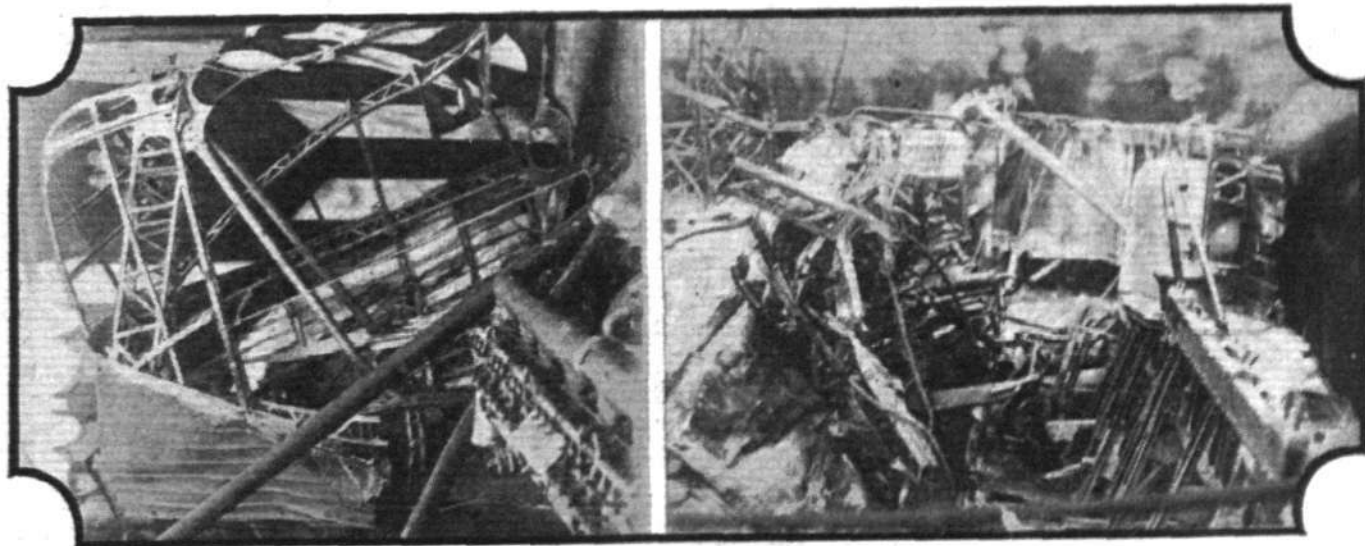
main framework it should be mentioned that the alloy employed does not appear to be made from the same constituents as in earlier types, having a decidedly "tinny" sound when lightly tapped. Also in appearance it looks different from duralumin, being less white, and looking in fact more like tin than aluminium. An analysis of the alloy would probably reveal the nature if not the proportions of the various ingredients.

The gondolas appear to have been built up in a similar fashion, only that they are covered with a corrugated sheeting of the same alloy. Wood appears to be entirely absent in the construction, and the greatest care in reducing the danger



ZEPPELIN GIRDER CONSTRUCTION.—For the lighter loads a beam of triangular section is used, the method of construction being clear from the sketch.

of fire is everywhere noticeable. Two gondolas have evidently each carried one engine driving, *via* a clutch and gear-

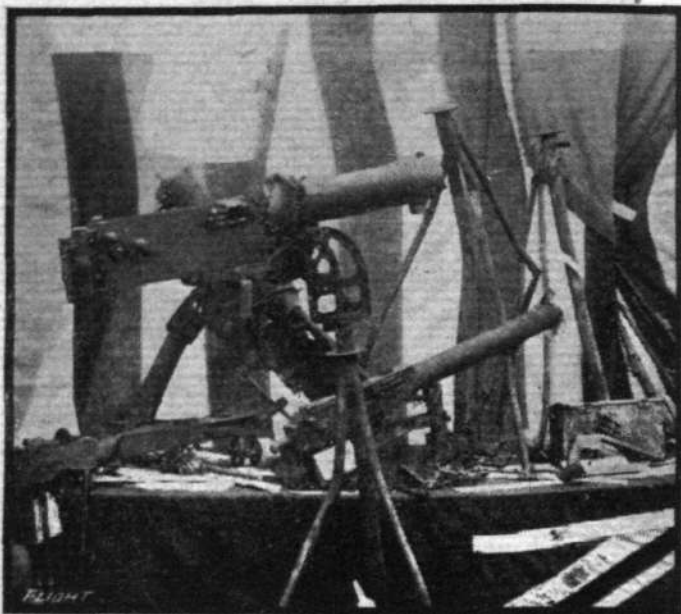


TWO BADLY "STRAFED" GONDOLAS.—On the left the remains of what appears to have been one of the end cars with a single engine driving a propeller, the boss of which can be seen protruding in the left-hand corner. The car shown on the right appears to have accommodated two engines driving the side propellers through bevel gearing.

box, an air screw placed at the rear of the gondola, a large thrust bearing transmitting the push of the screw to the framework through diagonal compression struts. Two more propellers were mounted on tubular brackets under the belly of the main hull, each driven by an engine in a third gondola, through bevel gearing. These side propellers, in addition to their ordinary functions, are evidently used for ascending and descending, giving, according to the direction in which they are rotated, an upward or downward pull. The gear-boxes are provided with two speeds forward and two reverse, so that considerable flexibility in manœuvring is obtained.

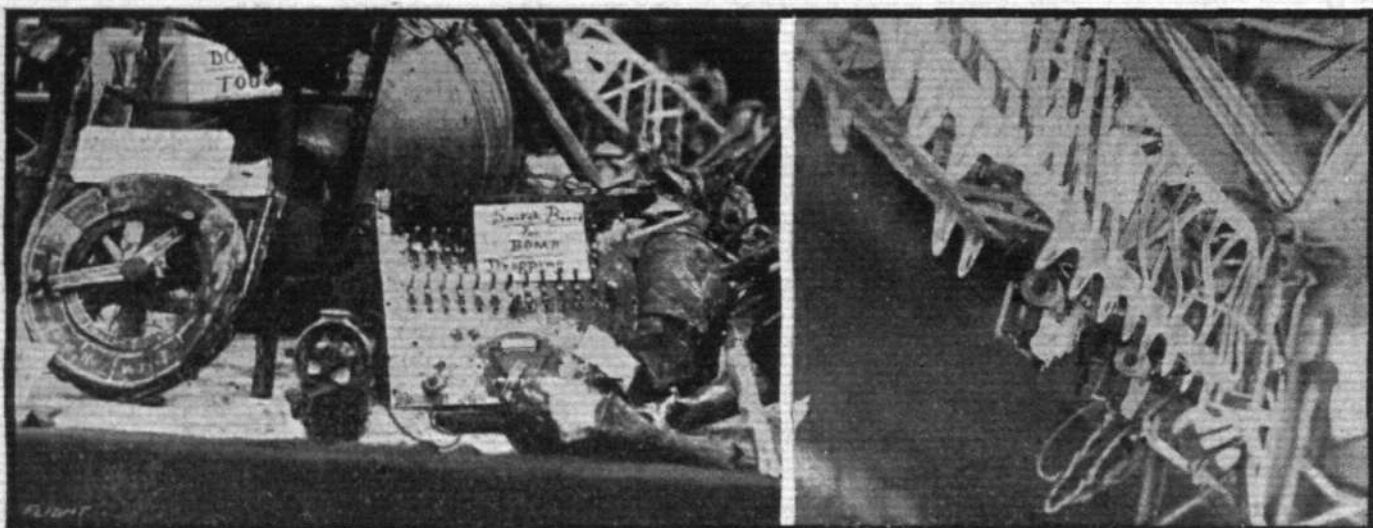
Among the items of special interest may be mentioned the engine-room telegraph shown in one of our photographs. It is a circular disc divided up into sections bearing various inscriptions such as—Laterne ein (Searchlight on), Laterne aus (Searchlight off), Leer (Idle), Halb (Half), Voll (Full), Alle Kräfte (All out); while corresponding to some of these are the engine revolutions running up to 1,500, corresponding to the "All out" indication on the outer section, and which therefore appears to be the maximum revolutions of which the engine is capable when under load.

Next to the engine-room telegraph on a table is the switch-board operating the dropping of bombs. There are on this board 26 switches, this number therefore indicating the number of bombs carried, or, at any rate, the number of bombs ready in position for dropping, and judging from the method of mounting the bombs it appears unlikely that "reloading" is possible while in the air. On a long and rather heavy beam which appears to have formed a sort of keel are a number of bomb release devices, consisting of an electro-magnet with its armature, and of a small hook. When a current is passed through the winding of the electro-magnet by closing the corresponding switch on the switch-board in the commander's cabin, the armature is drawn



Some machine guns from the wrecked airship, with their mountings and ammunition.

formed by rubber rings. The cooling water is allowed to circulate round the carburettors, thus helping to heat the mixture before it enters the induction pipe. On the exhaust side the water circulation includes the exhaust pipe which is



In the left-hand photo. is shown: On the left, the engine-room telegraph, and on the right the switch-board from which the bomb-dropping is controlled. The right-hand picture shows two of the electrical bomb releases mounted at intervals along a long girder, and operated from the switchboard in the left-hand picture.

towards the magnet, and by its movement releases the catch of the hook from which the bomb depends, thus releasing the latter. It would appear that the bombs are slung from this keel girder in a long row, the release mechanisms being connected up to the switches in such a manner that throwing over the first two switches releases the front and rear bombs, and working in this way towards the centre so as to not upset the fore and aft trim of the airship.

The engines, of which several are on view, some from the airship brought down at Cuffley and some from that which fell in Essex, are all of the same type, i.e., six-cylinder vertical developing—we should say some 250 h.p. each. Overhead valves are used, of which there are five in each cylinder, two inlet and three exhaust valves. The mixture enters through one long straight induction pipe drawing the gas from two carburettors, one at each end of the engine. The carburettors are aluminium castings bolted to the opening in the end cylinder corresponding to the cooling-water passages in the sides of each cylinder, a watertight joint between which is

surrounded by a water jacket. Wire gauzes are inserted at all points where a flame might possibly escape, and every precaution is taken to guard against fire. The method of holding down the cylinders is very neat and simple, and consists in yokes between adjoining cylinders gripping a portion of the flange at the bottom of each cylinder and secured by long bolts, one on each side, passing down to the sides of the main bearings of the crankshaft so that the explosions put no strain on the crankcase itself. Dual ignition is provided, two magnetos being mounted on one end of the engine, one on each side and driven from the cam-shaft on that side. There are two sparking plugs to each cylinder—one on each side—one magneto serving the plugs on one side and the other the plugs on the opposite side. There is therefore little prospect of ignition trouble, since should one fail the other continues to fire the plugs on the other side.

Although not one of the chief attractions, a captured L.V.G. biplane was of considerable interest. It tallied in

every respect with the machine described in our issue of June 22nd this year, the scale drawings of which were done under great difficulties, being, in fact, done by a special method of perspective which "FLIGHT" has developed. It was gratifying to find that all the dimensions tallied with

those found by us. The machine described had a 160 h.p. Mercedes engine, while the one on view at the H.A.C. grounds was fitted with a 160 h.p. Benz. A Lang propeller had replaced the original German one, but that, of course, was not noticed by the majority of the visitors.

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Killed (Accidentally).

Po. 15757 F. W. G. Taylor.

Missing.

Flight Sub-Lieut. A. J. Chadwick, R.N.

Previously reported Missing, now reported

Prisoner of War in Turkey.

Flight-Com. G. B. Dacre, D.S.O., R.N.

Slightly Wounded.

F. 2363 G. Holloway.

F. 2381 G. B. Hughes.

F. 10126 T. G. Shepherd.

F. 3005 R. H. Whiting.

Reported by the War Office:—

Killed.

2nd Lieut. C. H. M. King, R.F.C.

Previously reported Wounded, now reported

Died of Wounds.

Capt. K. A. Brooke-Murray, A.S.C., attd. R.F.C.

Previously reported Missing, now reported Killed.

Lieut. E. C. Jowett, R.F.C.

Previously reported Missing, now reported Died of

Wounds as Prisoner of War in German hands.

Lieut. R. Burgess, Army Cyclist Corps, attd. R.F.C.

Died of Wounds.

2422 2nd Air-Mech. C. E. Norman, R.F.C.

5569 Corpl. D. B. Walker, R.F.C.

Wounded.

2nd Lieut. C. H. Bell, R.F.C.

2nd Lieut. F. C. Biette, R.F.C.

2nd Lieut. L. V. Drake, Yeomanry and R.F.C.

Capt. A. W. Field, Mach. Gun Corps, attd. R.F.C.

Lieut. R. V. Franklin, R.F.C.

2nd Lieut. R. S. Haward, R.F.C.

2nd Lieut. A. F. Livingstone, R.F.C.

2nd Lieut. G. Philippi, Dragoons, attd. R.F.C.

2nd Lieut. C. P. V. Roche, R.F.C.

2nd Lieut. N. E. S. Simon, R.F.C.

2nd Lieut. B. V. S. Smith, R. Warw. R. and R.F.C.

Capt. P. E. Welchman, R.E. and R.F.C.

9206 2nd Air-Mech. J. Howcroft, R.F.C.

7971 2nd Air-Mech. G. G. Taylor, R.F.C.

Previously reported Missing, now reported

Wounded and Prisoner of War in German hands.

Lieut. J. G. Robertson, R.F.C.

Previously reported Prisoner of War, now reported

Wounded and Prisoner of War in German hands.

2nd Lieut. J. H. Firstbrook, R.F.C.

Missing.

Lieut. B. T. Collier, R.F.C.

2nd Lieut. S. Dendrino, R.F.C.

2nd Lieut. A. T. Easom, R.F.C.

2nd Lieut. F. St. J. F. N. Echlin, R.Fus., attd. R.F.C.

Capt. D. B. Gray, Indian Infantry, attd. R.F.C.

Lieut. E. E. Lansdale, A.S.C. and R.F.C.

Lieut. J. H. Bowson, R. Scots, attd. R.F.C.

2nd Lieut. T. E. G. Scaife, Dragoon Gds., attached R.F.C.

2nd Lieut. H. A. Taylor, R. West Kent and R.F.C.

1864 Sergt. J. E. Glover, R.F.C.

3389 Sergt. B. Irwin, R.F.C.

Previously reported Missing, now reported

Prisoners of War.

10387 2nd Air-Mech. T. N. Robinson, R.F.C.

1746 Sergt. G. Topliffe, R.F.C.

Improvement in the Russian Flying Services.

At the Staff here, writes the *Daily Telegraph* correspondent at Petrograd, the gratifying statement is made that during the recent fighting in Galicia the Russian air service has had great successes, not only widening the sphere of its activity, but even changing its character as a military instrument. As on the Western Front, so here the aeroplane has ceased to be merely a means of scouting, and is becoming ever more and more a fighting weapon for use in the very thickest of the fray. This news is all the more welcome, because until lately the air service was one of the weak spots in Russia's military equipment.

Bigger German Anti-Aircraft Guns.

ACCORDING to the *Echo de Paris* a tendency has been observed among the Germans to strengthen seriously their air services as well as to increase the size of their anti-aircraft guns. With their 5-in. guns, which have a range of 8½ miles, fusing (? incendiary) shells succeed from time to time in reaching our machines.

Funerals of the Burnt Zepp. Crews.

THE bodies of the 22 Germans who perished in the Zeppelin which came down in flames in Essex on September 24th were buried on September 27th. The coffin of the commander bore the inscription, "Commander Brodruck, killed on service, September 24th, 1916." According to the *Kreuzzeitung* he was Naval Lieut. Karl Brodruck, a son of Lieut.-General Georg Brodruck, and possessed the Iron Cross of the First and Second Class.

On the 5th inst. the 19 bodies recovered from the wreck of Zeppelin L31, brought down at Potters Bar on October 1st, were buried at the local cemetery alongside those who perished in the destruction of L21 at Cuffley. The coffin of the commander bore a brass plate with the inscription "Commander Mathy, died on service, October 1st, 1916." At the inquest on the preceding day it was stated in evidence that a tablet on the body of the commander bore the inscription "Kptln. Mathy, L31." The verdict was to the effect that

death was due to injuries received whilst travelling in a hostile airship. The evidence showed that none of the victims were alive when found.

A Missing Zepp. Commander.

A REPORT, under date October 6th, from Constance, asserts that the commander of the last Zeppelin brought down in England was named Bernhard Schreib-Mueller, who for his earlier exploits had been decorated with the Iron Cross of the 1st and 2nd Classes and the Bavarian and Hanseatic medals. Before entering the Army he was an officer of the Lake Constance Navigation Co. Possibly this refers to the commander of the Zeppelin wrecked near the Essex Coast.

Another Zepp. Commander Killed.

ACCORDING to one of the latest German casualty lists, Naval Lieut. Werner Peterson, commander of a naval airship, has been killed in action.

More Zeppelins Reported Wrecked.

FISHERMEN arriving at Esbjerg last week reported that at midday on October 2nd they sighted a partly submerged Zeppelin about 35 miles north-west of List, on the Island of Sylt. The airship was surrounded by German torpedo-boat destroyers, and two larger vessels were on either side of the envelope attempting to keep the airship afloat.

According to reports from Amsterdam a Zeppelin, apparently returning from England, was seen on October 2nd about 5.30 a.m. over the Frisian village of Zwaagsteine with the cigar-shaped stern end missing. Part of a cabin appeared to be projecting beyond the flat end. Its course was very erratic.

In its issue of October 4th the Dutch paper *Les Nouvelles* stated that it was in a position to affirm that in the French aerial attack on Mannheim on September 22nd bombs fell on one of the principal hangars and destroyed a Zeppelin, 230 metres long, fitted with eight engines. A gas reservoir standing on the aerodrome was also hit and exploded. The paper adds that to prevent news of the disaster getting abroad the town has been isolated till October 10th.



ONCE, in the dear old days when we had winters, in England, I had occasion to send for a plumber. He came with his mate, and they stood and looked at the job for a few breathless moments the while I stood by awaiting the verdict, for all the world like a criminal awaiting a decision for or against me. We stood a little to one side to avoid getting wet, and then the verdict was pronounced. "Yes," he said, "it certainly is a burst." And the mate concurred. Then one went back for the tools.

I could never understand why when one sends for a plumber he always comes without tools, and I had the temerity to ask this one. "How do I know," he answered, "what tools I shall want until I have seen the job?" Inspiration must come when a plumber looks at his job, or is it the laying out of the tools in a neat row that leads on to a knowledge of what to do?

A writer has no tools except his pen, and looking at his job is worse than useless. Sometimes when I look at the sheets needing covering to form this page, I could wish I were a plumber.

If I had a bass or a carpet bag full of tools, it appears to me that the job would be easy. Inspiration would come with their handling, but what can one do with but a pen? It is possible that I have the wrong kind of pen. There is one, I believe, known as the Facile pen. Mine is of the common variety known as Fountain, and at times it won't "fount" worth a ha'penny squirt.

No doubt but that those who write the "Woman's Page" in our daily journals have a very facile pen, and a heavily gold-mounted one at that. I have a page before me in which the writer touches on everything interesting to women, from the proper costume to wear when the Zepps. come, to the market price of sweet potatoes.

It is whispered in journalism that in many instances "Auntie" or "Cousin Alice" is a man in disguise. If that be true, he has my deepest sympathy for that which he has to do, and my entire and unalloyed appreciation of the way he does it.

Yet I think in this instance it is one of the gentler sex who wields the facile pen. It appears to me that this sentence gives the clue. "After every raid one hears stories of the sketchiness of the costumes displayed by ladies *en route* for cellars and safety."

Now the place where men hear "stories," Zepp. and otherwise, is generally the Club, and no man, at any rate no Nice Man (as our woman writer would put it) ever recounts to his friends stories of how the women folk of his establishment dress when they bolt for a seat among the best Wallsend. Apart from that, the costumes, or lack of them, hurriedly donned in

such trying moments, do not as a rule lend themselves to artistic description. I think the ladies who lay in special costumes of the "chic" variety on purpose for Zepp. raids, must reside in boarding houses. There are wonderful possibilities in a boarding house. "Cellars and safety," indeed. Valenciennes lace and blue tieups and coal dust and a pair of strong arms and a pretty little thing who knows just when to cry and be afraid, is an explosive mixture and does not make for safety.

But about these costumes. Here is a description. It is called a "jumper frock," but whether it is so called because one jumps out of bed or jumps into it, or because the wearer is preparing to jump somebody's claim, I do not know. "It is made of beautiful materials, and nothing is considered too costly for its decoration." I hope my lady readers will forgive me, but it does appear that women have no niggardly hand when they put capital into a promising investment.

"Another novelty is the Jumper Pyjama, made of black crêpe de chine (I am quoting) with a flesh-coloured blouse." This, it says, "has been specially created to meet the how-to-dress-when-the-Zepps.-are-about-problem." Words fail me. There is no comment.

The same writer says, "A personal friend of mine however, may be described as being over-costumed on Saturday last. She appeared in the road, not only quite decently clad in pyjamas, but with the additional glories of white stockings, black boots, and grey silk (the word is hers) bloomers." Again I find evidence that the writer is a woman. No mere man would be able to see pyjamas, white stockings, and, er, the other things, all at one time. I did once see a man of the London Scottish, home on leave, run out in pink and white striped pyjamas and a kilt, but that was probably from habit. Judging from their costumes, ladies must take some little time to make up for the part.

However, it was the facile pen I started out to write about. Writing a little lower, of housing the working classes to be exact, she holds forth thusly. "Let there be no brass to polish, no horrid little flowers and leaves in bas-relief . . . no panels to the doors. Give the women nice deep sinks. Coppers with taps above them, and movable insides that can be lifted out and . . ." but why more of this? I simply wanted to show versatility, and what could be more versatile than to be able to write of crêpe de what-you-may-call it and a movable inside? And to show pluck, she concludes, "If the builders want any more useful hints they may write to me."

Failing any possibility of my ever becoming a plumber, I wish I had a Facile pen.

ANSWERS TO CORRESPONDENTS.

If in doubt about anything aviatric, write to "FLIGHT" about it.

R. W. P. (S. Farnborough) sends us the following query:—

"What is the 'liner of the air' likely to be like as regards design and speed? A liner that would carry a hundred passengers?"

This is really looking ahead, and we pass the question on to our readers. *The Sphere* has reproduced some very fascinating designs in this direction.

P. H. B. (Rothley).

The thrust obtainable with a given engine depends on the propeller efficiency and the translational speed of the aeroplane. Approximate estimates may be made by assuming a certain propeller efficiency and substituting in the formula

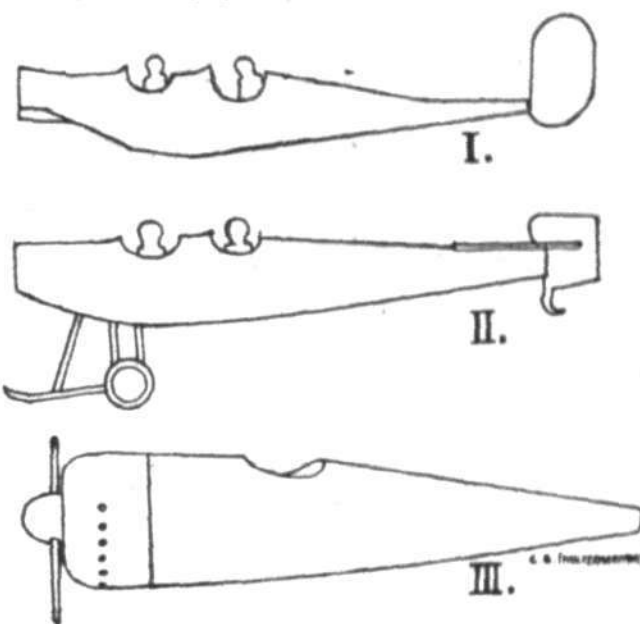
$$P = \frac{550 \times H \times Ep}{V} \text{ where } H = \text{brake-horse-power of engine,}$$

Ep = efficiency of propeller, expressed as a decimal, and V = translational speed of the aeroplane in feet per second. A fair propeller efficiency to assume is 75 to 80 per cent., expressed in the above formula as .75 and .80 respectively. The nacelle of a "pusher" biplane is not included among items in the slip stream, being in front of the air screw. There is no fixed relationship between the area of main planes and the area of tail plane, as this depends on several factors. In modern machines the area of the tail planes varies from about one-sixth to one-tenth of that of the main planes. This figure includes both fixed tail plane and movable elevator flaps. In his book on "Aeroplane Design," Capt. F. S. Barnwell, R.F.C., suggests that the ratio of elevator area to tail plane should lie between the limits of .6 to .4 and .3 to .7, as outside these limits the machine will be either heavy on the controls or slow to respond.

C. B. (Wolverhampton).

It is impossible to give exact figures regarding the resistance of aeroplane bodies or fuselages, as this varies considerably according to size and shape. In the accompanying sketches are shown three different shapes of bodies, the resistance of which was determined by—No. I, the N.P.L.; No. II, by J. C. Hunsaker and D. W. Douglas at the Massachusetts Institute of Technology; and No. III, by Mons. G. Eiffel. The models are of different sizes so that it is difficult to provide proper comparison between them. The length of body No. I is not stated, but it was made to $\frac{1}{8}$ -in. scale, and tested at a velocity of 30 ft./sec. = about 20.5 m.p.h., at which velocity the resistance was 0.0165 lbs. This gives a resistance for the full-size body at 100 m.p.h. of 97.6 lbs. with rudder. It is reasonable to assume a length of 20 ft. A model of body No. II to $\frac{1}{12}$ -in. scale was tested at a velocity of 30 m.p.h., when the resistance was 0.1365 lbs. The resistance of the full-size (24.5 ft. long) body, with tail planes and undercarriage, is 218.4 lbs. at 100 m.p.h. No. III

is a model of a Deperdussin *monocoque* body to $\frac{1}{4}$ -in. scale and was tested at a wind velocity of 28 metres/sec., when the resistance was 0.377 kilog. This gives a resistance of the full-size body (14 ft. long) of 52.16 lbs. at a speed of 100 m.p.h. These results were obtained with the engine cowl in place and with the propeller held stationary. When the propeller was allowed to act as a windmill, driving the engine round, the resistance was considerably greater. As already mentioned, these experiments do not afford any ready comparison, as the bodies tested differ not only in shape but also in size, while one is fitted with undercarriage and tail planes, another with engine and propeller, and a third with rudder only.



They may be of use, however, in a general way, to give an approximate estimate of body resistances.

R. H. (Brixton).

When the engine of an aeroplane stops during a flight the machine proceeds to descend by the action of gravity. For instance, if a machine is said to have a gliding angle of 1 in 8, it means that if the weight of the aeroplane is = W , its resistance to horizontal motion (at a certain speed) is $\frac{W}{8}$, and that therefore it will, if the engine is stopped, glide down a slope of 1 in 8.

New Rank in the R.F.C.

A RECENT Army Order states that the titles of Equipment Officers and Assistant Equipment Officers in the Royal Flying Corps will in future be Equipment Officer, 1st Class, and Equipment Officer, 3rd Class, respectively. A new grade of Equipment Officer, 2nd Class, is also constituted with pay at the rate of 18s. a day, which includes flying pay.

Fatal Accidents.

At the inquest on October 4th on Flight-Lieut. Cyril Donald Jenkins, of Swansea, who was killed while flying, the evidence showed that engine trouble occurred while he was ascending. The jury found that death was due to shock.

An inquest was held on October 9th on the body of Second Lieut. Harold Baker, R.F.C., a Canadian, who was killed on the previous day. The evidence showed that from a height of 2,000 ft. the machine dived sharply with the engine working. When climbing after the dive the machine

collapsed and fell, the pilot being killed instantly. The accident was attributed to the excessive speed caused by the dive. A verdict of "Accidental Death" was returned.

Zepp. Sheds in Belgium.

REPORTS from the Belgian frontier state that the Germans have considerably enlarged their airship hangars at Antwerp. The Maastricht newspaper, *Les Nouvelles*, reports that the last British air raid on Brussels was particularly successful in its attack on hangars at Berchem Ste. Agathe. One hangar was demolished. A cordon of German troops is now guarding the approach to it. Access to the neighbourhood is absolutely forbidden.

More Flyers from Australia.

A CABLE message from Melbourne states that, in addition to the monthly reinforcements for the squadrons already abroad, further recruits are being enrolled in the Flying Corps in Australia.

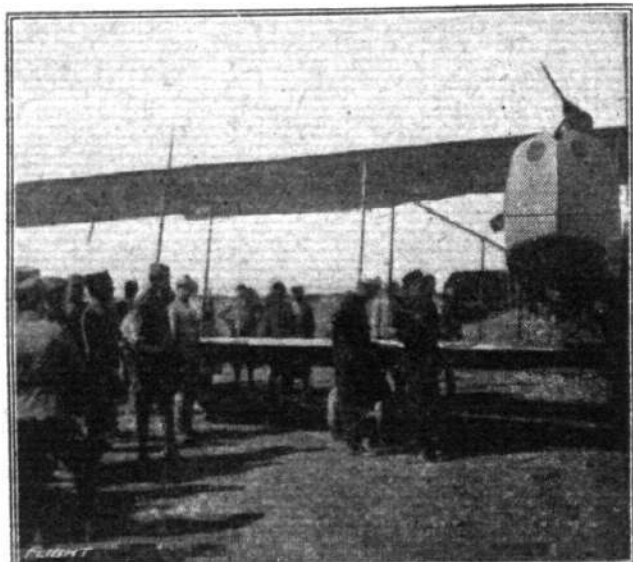
AIRISMS FROM THE FOUR WINDS

HUN "frightfulness" in the air is apparently not so novel an idea as most folk have ventured to think, judging by a caricature, dating from 1784, which has been dug up by a

prophesying great things of his project. The legend reads : "O by Gar! dis be de grand invention. Dis will immortalise my King, my Country, and myself. We will declare the war



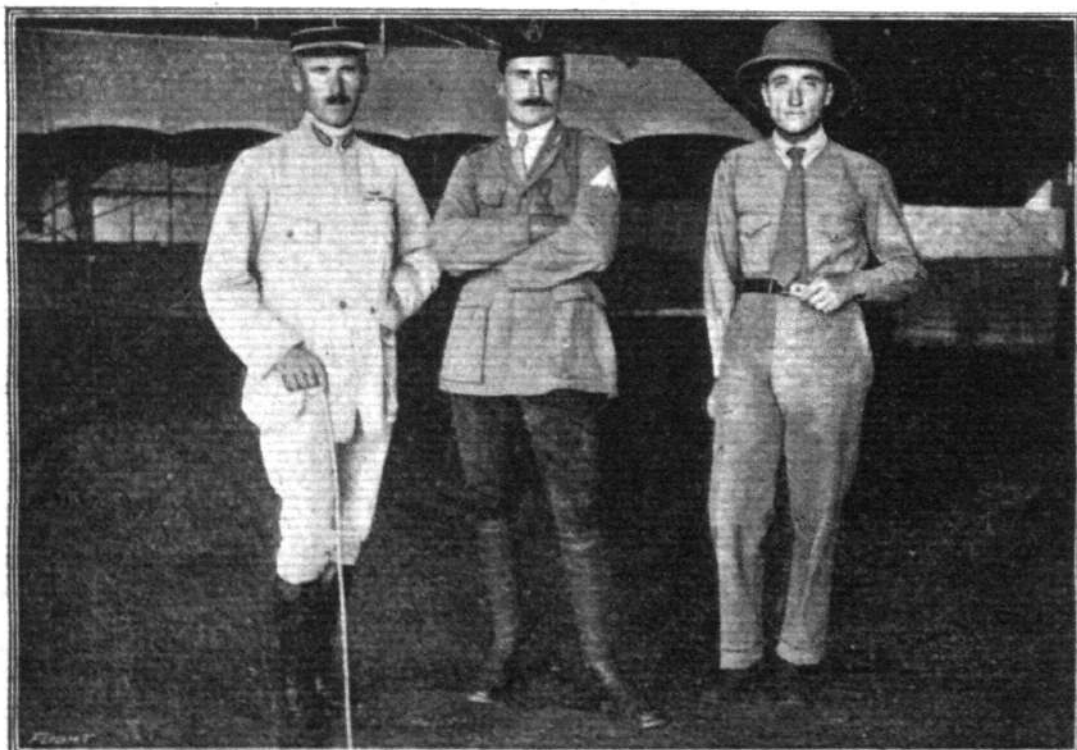
A portrait of Sous-Lieut. Louis Noel taken by his observer, Lieut. Leseur, whilst crossing the Danube during his great flight to Bucharest.



A snapshot at Bucharest taken immediately after Louis Noel landed.

correspondent of the *Westminster Gazette*. In this old print the French inventor of the fire-balloon, Montgolfier, is shown blowing bubbles, and, in the usual facile way of inventors,

against our Enemie : we will make des English quake, by Gar! We will inspect their camp, we will intercept their fleet, we will set fire to their dockyards, and, by Gar, we will take Gibraltar in de air-balloon. And when we have conquer



An interesting group taken four days before Louis Noel's flight [across Bulgaria. Reading from left to right : Sous-Lieut. Louis Noel, Lieut. Maire, Chief d'escadrille, and Lieut. Leseur, Noel's observer.

de English, den we conquer de other countries, and make them all colonie to de Grand Monarque." Count Zeppelin should be terribly upset to find that, after all, his methods have been anticipated, if only by suggestion.

THE great lighting—or is it darkening—problem is still breaking new ground in all sorts of ways. By way of experiment the Wandsworth Highways Committee propose extinguishing for a period of a month all street lamps in the borough at 10 o'clock at night.

"GERMANY claims to have 80 Zeppelins, and that she can build two each month.

"Britain has proved that on the average she can bring down one Zeppelin a week.

"Working on these figures, how long will it be before the entire Zeppelin fleet is destroyed?"

THE above is a problem recently set school children by their teachers, after having read Lord French's first report on a Sunday night's raid in an area fairly familiar with Zepp. visitors. Complete answer after Peace terms are fixed up.

ZEEBRUGGE Lighthouse appears to be the beacon light which helps to guide home and serve as a rallying point for the Zepp. raiders after their jaunts over British soil. A little special attention to this prominent object of the "landscape" from our air services might be worth consideration.

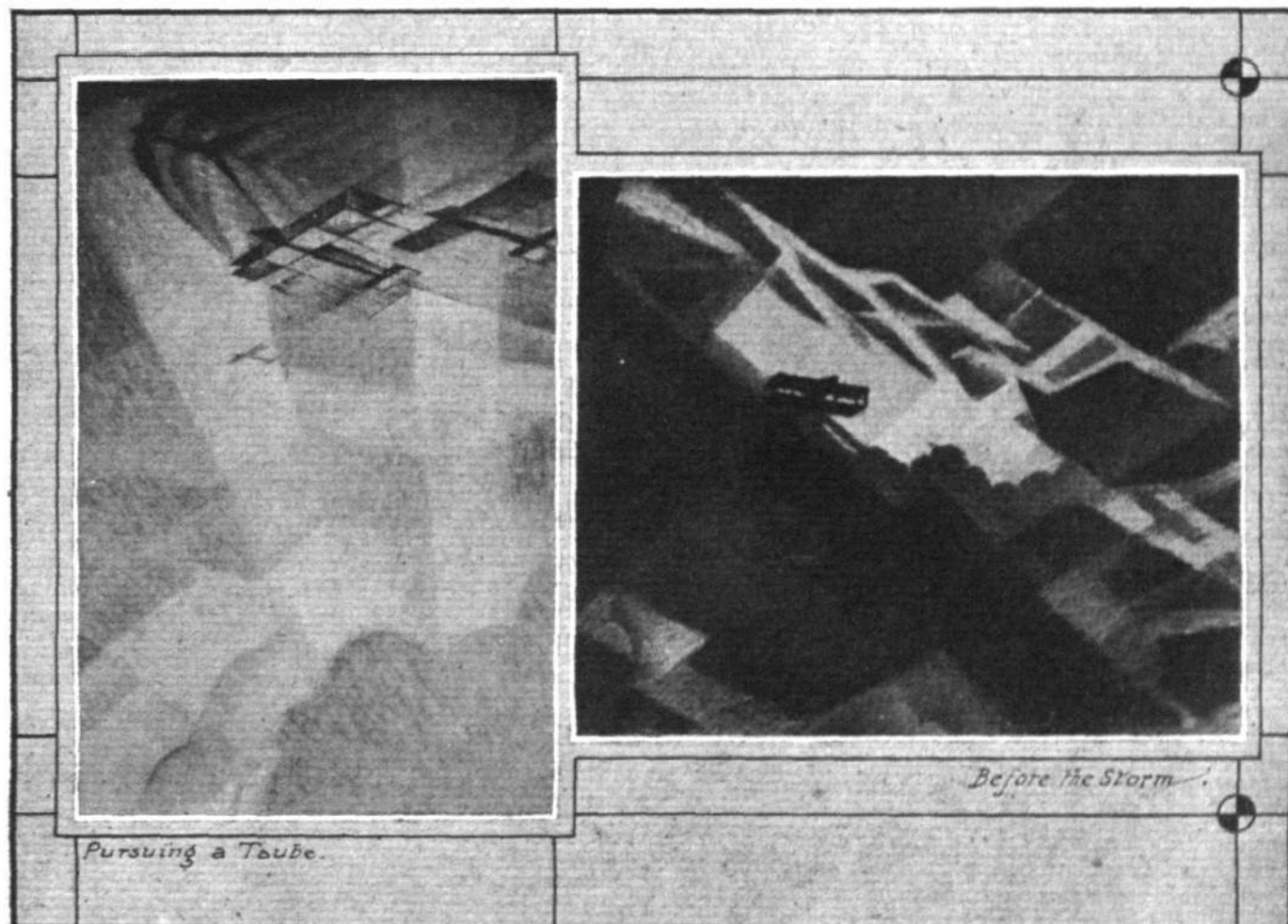
IN the United States there appears to be much excitement over the U-boat campaign adjacent to American waters. It certainly does bring the European conflict a bit close home to the nation which is too proud to fight. There is plenty in the episode for our "Cousins" to ponder, as to its effect upon their own naval program—one *m*, please, and no *e*. And in their pondering they must not forget to include adequate provision for naval units in more than one ocean, as if the

Panama Canal existed not. For has not the advent of aviation practically nullified any increased efficiency which their fleet was to have by its use? It is difficult enough now to keep the channel open from landslides. What a few super-aeroplanes could effect in the way of helping Nature in this direction can be left to the imagination of future generations.

PERHAPS after all, though, the Wilson "proudness" is not quite understood by the older nations, as the President now affirms—election stunting is in full blast across the herring-pond just now—that "America is as ready to fight as any nation, but the cause must be just. After the war America must join the league of nations to preserve the peace of the world." Possibly President Wilson has not yet heard officially of the "just cause" of Belgium. If it were not all so tragic it really would be screamingly funny.

MR. F. W. LANCHESTER has decided to issue another book on things aviatic, entitled "The Flying Machine from an Engineering Standpoint." It can hardly be deemed a new work, as the main basis of the contents will be the author's "James Forrest" Lecture which he delivered in abstract before the Civil Engineers before the War—to wit, on May 5th, 1914. The volume is to be issued immediately by Messrs. Constable and Co., and the publishers point out that this publication derives its importance as being a definite pronouncement as to the technical and scientific position of scientific knowledge so far as concerns the heavier-than-air machine at a date just prior to the outbreak of war. The volume will also include Mr. Lanchester's paper which he contributed to the Engineering Congress of San Francisco in 1915.

At Bow Street the other day Walter Schulchess—sounds like a good old British name—manager of the Corner House



Two remarkable war pictures by C. R. W. Nevinston (late R.A.M.C.), now on exhibition at the Leicester Galleries, Leicester Square. (Reproduced by permission of the proprietors of the Leicester Galleries.)

Restaurant in Coventry Street, was fined £5 for an offence at the said establishment against the lighting regulations on September 22nd.

£5 OR 31 days—why 31, we wonder—was the well-merited punishment meted out by the West Ham magistrate on Arthur Thomas Oxford, a Canning Town boilermaker, for spreading a false report about "a big fleet of airships coming over to-night." The laying of him by the heels was a smart piece of work on the part of a "Special."

In view of the large amount of ash used in aeroplane construction, it has been suggested that "Hearts of Ash" would be an appropriate aero-nautical ditty in the years to come.

THE War Office has presented an Albatros aeroplane to Cambridge University.

It may be of interest to note, in connection with the construction of the latest Zeppelins, that although these are started in Germany, they are finally finished in England.

ATLANTIC CITY from above by moonlight is one of the latest thrills provided for air-trippers, for Aviator Beryl H. Kendrick, who has already demonstrated the success of such a plan, has made arrangements for carrying out a series of these flights with his airship.

MISS MARJORIE STINSON, who hitherto has been flying Wright biplanes, made her first flight in a tractor biplane—the 50 h.p. Brock—last month in quite finished style. In future she intends using this machine for exhibition work.

WALTER L. BROCK, by the way, is building a Morane-Saulnier-type monoplane, with which he hopes to put up "some" exhibition flying.

WHEN invited to come for a flight, Miss Laura Anderson, of Montreal, consented on condition that she could carry on knitting socks for soldiers, and so, piloted by S. T. Meyerhoffer, the industrious young lady knitted away serenely as they flew over the city. At least, so the story goes.

ACCORDING to the *Revue des Produits Chimiques*, analysis of the metal parts of the Zeppelin brought down in Paris recently showed that the constituents were as follows: Angle brackets—aluminium 90.27 per cent., zinc 7.8 per cent.; channel members—aluminium 88.68 per cent., zinc 9.1 per cent.; bracings—aluminium 99.07 per cent., zinc 1.3 per cent. A small quantity of other ingredients consisted of copper, tin, manganese, iron, nickel and silicon.

In an "expert's" aviation article in a contemporary, it is stated: "We cannot imagine that Lieut. Robinson's exploit caused the Hun any serious mental agitation, for, lacking definite news, he was prepared to accept the loss of the non-rigid aeroplane, wrongly and absurdly described by our authorities as a Zeppelin, as a piece of sheer ill-luck." This even tops the description in the same "weakly" of a J.A.P. engine as one of Japanese make.

AMONGST the cards bearing such words as gondola, engine, radiator, &c., at the exhibition of Zepp. relics, was one inscribed "Silencer," and having in the corner a minute object. Closer view discovered one of these indiarubber comforters for babies. English designers may make drawings and take measurements. Who was the joker?

It is a pity something better in the way of design could not have been thought out for the badge of the R.F.C.

Hun "Frightfulness" in a New Phase.

At a meeting of the Executive Committee of the Navy League, on Tuesday, the following resolution was unanimously adopted:—

"The Executive Committee of the Navy League has heard with profound concern that the German Military Authorities propose to hold a court-martial on British airmen who are alleged to have been found with 'tracer' bullets in their possession; if the fact be as stated the Navy League demands that similar treatment shall be promptly meted out to the crews of German Zeppelins now prisoners of war in England

Observer. It is a lop-sided looking affair, and causes a brave body of men to be known as "Onewingers."

In a London suburb is a row of 12 houses, each let to two families, perhaps a hundred humans in all. Opposite is waste ground. A bomb fell 15 yards in front of the middle houses, more or less altering the shape of the whole row! Not only was nobody killed, but none were injured. Just a severe fright or so, that's all.

A SHORT while ago one of our staff tried for the tenancy of a villa in Essex, but the landlord would only sell. Standing empty it came to grips with a bolt from the blue, fairly and squarely. Good luck!

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister Journal) of October, 1906. "FLIGHT" was founded in 1908.

THE GORDON-BENNETT BALLOON RACE.

The start of the 17 balloons for the great Aerial Derby, as it has come to be called, which took place on Sunday afternoon last in the Tuileries Gardens, Paris, was in every way a success from a spectacular point of view. The weather was delightful, the numbers of spectators enormous and enthusiastic, and the organisation was so perfect that each competitor was started off at the right moment with the regularity of clockwork, while military bands enlivened everybody and gave a holiday atmosphere to the proceedings.

Some excitement was occasioned by nothing being heard of the Hon. C. S. Rolls till some of the later evening papers came out on Tuesday evening, when it emerged that he had eventually landed near Sandringham after a satisfactory but not particularly exciting voyage.

The results were subsequently announced as follows:—(1) "United States," 400 miles; (2) "Elfe," 370 miles; (3) "Walhalla," 294 miles; (4) "Britannia," 287 miles; (5) "Zephyr," 212 miles; (6) "Ville de Chateauroux," 206 miles; (7) "Montana," 200 miles.

COUNT ZEPPELIN'S FURTHER SUCCESS.

It is with real satisfaction that all who take an interest in the navigable airship will learn that recent experiments at the Lake of Constance with the Zeppelin airship proved most satisfactory. This great vessel is now furnished with Daimler motors supplying 85 h.p., and has proved so much more manageable than on any previous occasion, that future trials are to be conducted not only over Lake Constance, which has hitherto been for safety's sake the scene of the airship's manoeuvres, but also are to be undertaken over land. The airship, which is said to have attained speeds of 45 kiloms. per hour, started from Manzell on the Wurtemberg side of the lake, proceeded in the direction of Constance, and when close to the shore at that point ran down the south-western shore of the lake to Arbon, and then struck nearly due north back to Friedrichshafen, and from there coasted round the short distance—nearly 70 kiloms.—to the starting point.

MAJOR GROSS, OPTIMIST.

The successful performance of the Zeppelin airship, amongst other results, has been productive of a lecture by Major Gross to the International Aeronautic Federation, held in the Charlottenburg High School. In his observations, Major Gross maintained that "the principle of construction for airships is now absolutely clear. That there is no further question of inventing an airship, but merely of actually constructing one." Well, of course, it is all a matter of what one means by invention. Even Major Gross admits that steering arrangements are not at present absolutely ideal, though how far they are to be brought into an ideal condition except by the exercise of further invention is not quite plain.

with whom 'tracer' bullets have been found when raiding airships were recently brought down in this country."

German Aerial Losses.

In addition to Lieut. Wintgens, Germany has recently lost three pilots who have figured prominently in Headquarters *communiqués*. They are Lieuts. Mutzer, Muller and Schwartzkopf, each of whom had been given the Order of Merit for their exploits. According to the *Cologne Gazette*, Wintgens was attacked from behind when flying at 12,000 ft., and a bullet struck his petrol tank, which caught fire, and the machine fell to the ground wrapped in flames.

PERSONALS

Casualties.

Lieutenant DONALD BECK, R.F.A., attached R.F.C., reported killed, joined the Motor Cycle Corps (Territorials) on August 5th, 1914, and after a month obtained his commission in the Royal Field Artillery. In May, 1915, he went to Egypt, and thence to Salonica, and at the beginning of 1916 he joined the Royal Flying Corps as an Observer, in Egypt. He came home in June, and passed the first part of his pilot's certificate with distinction, and was completing his flying courses when he met his death on September 21st. He was the only child of Commander O. L. Beck, R.N., and Mrs. Beck.

Second Lieutenant JOHN HAMPSON DODGSHON, Surrey Yeomanry and R.F.C., son of the late Edmund Dodgshon, of Manchester, was killed on October 1st whilst flying over England, at the age of 25. He was educated at Westminster, and was a member of the school cadet corps. He joined the H.A.C. in July, 1913, and played Rugby football for the corps. He went abroad with the H.A.C. in September, 1914, and spent the first winter of the war fighting in Flanders and France. He was invalided home, and on his recovery was gazetted a commission in the Surrey Yeomanry. He served for six months in Egypt, and was at the Dardanelles as Assistant Military Landing Officer. On his return to England he declined a post as Assistant Equipment Officer in the Royal Flying Corps, as he felt he ought to take a more active part in the war. He obtained his "wings" last August, and was made an instructor.

Second Lieutenant CYRIL HENRY MARSHALL KING, R.F.C., who fell on September 30th, was the youngest son of the Rev. E. G. King, D.D., Rector of Gayton, Northamptonshire. He was educated at the Preparatory School, Sherborne, Aldenham, and Birmingham University, where he studied engineering and gained a scholarship for research in his final B.Sc. examination. When the war broke out he enlisted in the Universities and Public Schools Brigade, and afterwards obtained a commission in the R.G.A. He went to the Front in 1915, transferred after some months to the R.F.C., and was gazetted as an Observer. Last June he came to England for his pilot's course, and he returned to the Front in August.

Captain KEITH LUCAS, Sc.D., F.R.S., R.F.C., Fellow of Trinity College, Cambridge, has died as the result of injuries received in a collision of aeroplanes on October 5th. A correspondent of the *Times* writes: "He had already acquired a world-wide reputation as one of the most promising physiologists of the younger generation. The older methods of research have in certain directions ceased to be fruitful; they are no longer adequate to settle the problems which present themselves. These problems require not only an intimate knowledge of physiology, but a most delicate command of instrumental methods. In designing instruments for investigation and in ability in handling them Keith Lucas stood alone." Dr. Lucas, who was born in 1879, was the son of Francis Robert Lucas, and was educated at Rugby and Trinity College, Cambridge, of which he became a Fellow in 1904. He was elected F.R.S. in 1913, and was invited to give the Croonian Lecture to the Royal Society even a year before his election to it. Before the war he was fully engaged in both teaching and research work at Cambridge, and was, moreover, one of the directors of the Cambridge Scientific Instrument Co. But on the outbreak of war all this was put aside in order that he might devote his rare instrumental skill and inventiveness to the Air Service. As testimony to his success we quote the following from the report of the Advisory Committee for Aeronautics as published in the *Times* of August 9th last: "A close study of the conditions affecting the aeroplane compass, with a view to its development and improvement, was undertaken at the Royal Aircraft Factory by Dr. Keith Lucas, F.R.S. As a result a type of instrument specially adapted for employment on an aero-

plane under the varying conditions which arise in flight was ultimately produced and standardised. This is the R.A.F. Mark II compass, which is now being made in large numbers. Flyers are much indebted to Dr. Lucas for the success attained in this investigation." But the compass was by no means his only achievement, and he became more and more engrossed in the work as time went on. Dr. Lucas married, in 1909, Alys, daughter of the Rev. C. E. Hubbard, and leaves three sons.

Second Lieutenant PHILIP J. SMYTH, Connaught Rangers, attached R.F.C., killed in action, was a son of Mrs. Bridget Smyth, Kinawley, Co. Fermanagh.

Married and to be Married.

A marriage has been arranged between Captain (Temporary Major) CUTHBERT EUAN CHARLES RABAGLIATI, King's Own Yorkshire Light Infantry and R.F.C., M.C., younger son of Andrea C. Rabagliati, M.A., M.D., of Whinbrae, Ben Rhydding, Yorks, and grandson of the late Duncan McLaren, M.P. for Edinburgh, and MONICA, only daughter of JOSEPH CHILD PRIESTLEY, K.C., of Tatmore Place, Hitchin, and granddaughter of the late Sir William Overend Priestley, M.D., of 17, Hertford Street, Mayfair, and M.P. for Edinburgh and St. Andrews Universities.

An engagement is announced between Captain ALEXANDER W. RUTHVEN STUART, Gordon Highlanders and R.F.C., younger son of the late William Whitwright Stuart and of Mrs. Ruthven Stuart, of 35, Sloane Gardens, S.W., and grandson of the late James Stuart and of James Alexander Ruthven, also great-nephew of the late William Whitwright, and STELLA MARION GRANT-DUFF-AINSLIE, eldest daughter of Julian Grant-Duff-Ainslie, of the Old Hill House, Hellingly, Sussex, and granddaughter of Mr. and Mrs. Ainslie, of Delgaty Castle, Aberdeenshire.

An engagement is announced between Captain HUGH TOMLINSON, M.C., R.F.C., son of the late G. W. Tomlinson, J.P., and Mrs. Tomlinson, 65, Iverna Court, Kensington, and MADELEINE DE LACY (MADGE), eldest daughter of Captain C. A. WICKHAM, R.A.M.C., and Mrs. WICKHAM, Willesborough, Ashford, Kent.

Items.

Second Lieutenant A. DE B. BRANDON, M.C., R.F.C., Special Reserve, who has also been appointed Companion to the D.S.O., was born in New Zealand in 1884. Educated at Wellington College, New Zealand, and Trinity Hall, Cambridge, he was called to the Bar in 1906, and after a short period in England returned to New Zealand, where he had been practising until the war broke out. Soon after the declaration of war he came to England, and eventually he joined the Flying Corps in December, 1915. Mr. Brandon receives the D.S.O. for gallant conduct and for devotion to duty, and not for destroying or assisting to destroy any particular Zeppelin. On the night of March 31st-April 1st, when Zeppelins dropped nearly 200 bombs, causing 100 casualties, he dropped several bombs over one of the raiders at a height of 9,000 ft., and his aeroplane was hit many times by machine-gun bullets. This was the occasion when the L.15 came down off the Thames Estuary, and another raider was hit and dropped part of its equipment in one of the Eastern Counties. Mr. Brandon also had a share in the destruction of the Zeppelin which was brought down on Sunday. Some time ago he dropped several bombs on an enemy seaplane at Dover.

Lieutenant E. M. GILBERT, R.F.C., who was recently awarded the Military Cross, was, at Enfield on Saturday, presented with a sword by munition workers in the Lea Valley.

Second Lieutenant F. SOWREY, R. Fusiliers, attached R.F.C., who has been appointed Companion to the D.S.O., is 23 years old, having been born at Gloucester on August 25th,

1893, and is the second son of Mr. John William Sowrey, of Staines, Deputy-Chief Inspector of Taxes at Somerset House. He was educated at King's College School, Wimbledon, and King's College, London. He was studying for the Indian Civil Service, but on war being declared was granted a commission in the Royal Fusiliers. He saw service in France with his regiment, and was wounded in the Loos attack in September last year. Mr. Sowrey was wounded afterwards at Ypres, and invalided home in November. He joined the Royal Flying Corps last January, took his pilot's certificate in June, and has been night flying since. He had flown during three raids before that on which he recently brought

down a Zeppelin in Essex, and was flying with his friend, Lieutenant Robinson, V.C., when the latter brought down the raiding airship at Cuffley a month ago. Lieutenant Sowrey has two brothers, also in the Royal Flying Corps. The elder, John, is a Flight-Commander, also engaged as a night pilot in aerial defence, and the younger, William, is serving as a pilot with the Expeditionary Force.

The will of Mr. CYRUS CINCINATO CUNEO, artist, aged 37, who died on July 21st, of Uxbridge Road, W., who did considerable work in the *Illustrated London News* and illustrated Rider Haggard's stories, and whose aviation pictures have attracted considerable attention, has been proved at £13,639.



A Desert Tragedy.

A propos of some lines written by John Drinkwater in the *Saturday Review* in memory of "Riddles," a nickname by which Second Lieut. Stewart Gordon Ridley was known in the R.F.C., the *Morning Post* gives the following details of this officer's tragic end:—

"He landed in Egypt at the beginning of June of this year, and was soon sent down to an oasis in the Libyan Desert. In the middle of the month he went out singly on a machine as escort to another pilot, who had with him a mechanic, named J. A. Garside. The work they had to do was at a considerable distance, and a camel patrol had been sent out in advance to form a temporary landing place or station, from which they had to operate. They left on Thursday afternoon, June 15th, and after flying an hour and a-half—half-an-hour longer than they should—they failed to find the camel patrol.

"As it was getting dark they came down and encamped for the night. The following morning the weather was not very suitable, and Ridley, having the light machine, suggested that he should try to find the proper track of the camel patrol. It was, however, found that his engine would not work. It had been giving him trouble the previous afternoon.

"The other pilot then decided that it was necessary that he should go back at once to the base (leaving his water and provisions) and find the exact position of the landing ground. He arranged that he should return on the following day (Saturday) and take Ridley and the mechanic (Garside) separately to the landing ground. He got back to the base, and found that, as the aviators had not turned up, the camel patrol had returned to the base. The pilot and the captain of the Camel Corps returned to the landing ground, and on the following morning (Saturday) the pilot began a search for the other two.

"After some time he reached the place where he had left them, but the mechanic (Garside) and Ridley had gone. They left some odds and ends behind them, but no note. The pilot and his companion returned immediately to the base, and when it was ascertained that Ridley and Garside had not come back, search parties, consisting of camel patrols, motor cars and aeroplanes were at once sent out.

"Nothing was discovered until the Sunday afternoon, when, 25 miles away from the spot where the first night had been spent, a second place was found. There the missing ones had landed, but they had again flown on after having patched up the machine. On the Tuesday afternoon the machine and two dead bodies were found by a motor party. During the search the pilot came across the footprints of two men walking. These were overtaken by a hostile camel patrol, and for a time it was thought and hoped that Ridley and Garside had been captured.

"It was, however, found that Stewart G. Ridley shot himself at half-past 10 on the Sunday night. The captain of the Imperial Camel Corps said that from what he discovered he formed the opinion that Ridley had done this in the hope of saving the mechanic, and the commanding officer of the R.F.C. also states: 'There is no doubt in my mind that he did this act of self-sacrifice in the hope of saving the other man.'

"After Ridley died Garside had kept a rough diary, of which the following is a copy:—

"Friday.—Mr. Gardiner left for Meheriq, and said he would come and pick one of us up. After he went we tried to get the machine going, and succeeded in flying for about 25 minutes. Engine then gave out. We tinkered engine up again, succeeded in flying about 5 miles next day (Saturday), but engine ran short of petrol.

"Sunday.—After trying to get engine started, but could not manage it owing to weakness, water running short—only half a bottle—Mr. Ridley suggested walking up to the hills. Six p.m. (Sunday): Found it was further than we thought; got there eventually; very done up. No luck. Walked back; hardly any water, about a spoonful. Mr. Ridley shot himself at 10.30 on Sunday whilst my back was turned. No water all day; don't know how to go on; got one Very light; dozed all day, feeling very weak; wish someone would come; cannot last much longer.

"Monday.—Thought of water in compass, got half bottle; seems to be some kind of spirit. Can last another day. Fired Lewis gun, about four rounds; shall fire my Very light to-night; last hope without machine comes. Could last days if had water.

"A party with a chaplain went out on Sunday, June 25th, and buried the two in the desert, and erected a cross with their names on it over the heap of stones covering the bodies.

"On his father's side Ridley came of a well-known Northumbrian family or clan, and the name of his residence, Willmotswick, takes one back to that old fortified farmhouse in Northumberland, where was born Bishop Ridley, who with Latimer at Oxford 'played the man.' His mother was born in Derry, where her own mother belonged. To this city Lieut. Ridley's maternal grandfather had come some years before from Newton Stewart, in Galloway."

CORRESPONDENCE.

Lady Smith-Dorrien's Hospital Bag Fund.

[1928] May I crave your assistance in an effort to obtain a further large supply of hospital bags by allowing this letter to appear in your columns. The utility of these small bags for the personal possessions of the sick and wounded admitted to hospital has proved so great that the demands of the Director-General of Medical Services, the Director-General of Voluntary Organisations and the Red Cross have, in consequence of heavy casualties, become overwhelming.

Since April 10th, 1915, my Fund, thanks to the generous support which my previous appeals have met with, has been able to despatch 970,000 hospital bags to the various theatres of war, hospitals in England, hospital ships, the French Red Cross and those of our other Allies. Never before has the Fund been unequal to supplying all demands, but now the last reserve has gone, and there is an order from the Front for 40,000 which I cannot meet at present. It is estimated that some 80,000 will be needed for each of the next two months. I should like to emphasise that not only the wounded but also the sick require the bags, which will explain the enormous numbers needed.

They should be made of cretonne or good strong unbleached calico, measuring not less than 10 ins. by 12 ins. when finished, with a double draw-string of tape and a glazed calico label 4 ins. by 2 ins. (for the patient's name) sewn flat in the centre of one side. I have secured a large consignment of cretonne at 6d. a yard (wholesale), and suitable labels at 4½d. per 100, and can supply at those prices on application.

Address:—Lady Smith-Dorrien, 5, Belgrave Place, London, S.W.

All parcels of above will be sent "carriage forward."

It will greatly facilitate packing for the Front if bags may be tied in bundles of 10 and not folded.

As there are considerable expenses in packing material, carriage, postage, &c., I should be very grateful for small donations towards them. Such expenses for the 16 months since the Hospital Bag Fund was started have amounted to £314 2s. 11½d.

OLIVE SMITH-DORRIEN.

"THE AEROPLANE OF TO-MORROW."

VARIABLE SURFACE AND STABILITY.

By LOUIS DE BAZILLAC, Engineer (École Supérieure d'Aéronautique de Paris).

Translated by B. BRUCE-WALKER, B.Sc.

(Concluded from page 861.)

Lateral Stability.

The lateral oscillations of the aeroplane and its changes of azimuth take place, in horizontal flight, about two perpendicular axes situated in the plane of symmetry. These are the axis of rolling and the axis of gyration.

Suppose a small disturbance to make the plane of symmetry of the machine turn through an angle $\delta\phi$ about its axis of rolling. If the speed keeps a constant direction the resistance R will not vary, and will remain with the speed in the plane of symmetry. But, from the time when the rotation $\delta\phi$ was effected, the pressure, which before the rotation annulled the weight W of the machine, now gives with this a resultant ρ which is not zero (Fig. 4).

Under the action of this resultant the machine begins to take up an acceleration directed according to ρ , which will make the velocity depart from the plane of symmetry. R will also depart from this plane, and its moment about the axis of rolling will no longer be nil; it will, therefore, make the machine turn about its axis. If this rotation decreases $\delta\phi$ the machine will be stable; if it increases it, it will be unstable.

The stability against gyration can be measured by the moment of the couple which tends to bring the plane of symmetry back to the direction of the relative wind immediately this has changed.

It is easy to see that the couple of stability against rolling is just as much a couple of stability against gyration. The two problems of stability against rolling and stability against gyration are then intimately connected in the problem of lateral stability.

This granted, let us consider an invariable aeroplane undergoing a deviation of rolling or of gyration, and suppose that, whatever its form, it cannot return after this displacement to its usual orientation. We should say that such a machine cannot realise lateral stability. Experience shows us that it is not so generally.

In the case, however, in which the above hypothesis is borne out, does there not exist some means of rendering the machine automatically stable?

We shall see that the automatically variable surface advocated above for longitudinal stability fulfils here again all the conditions

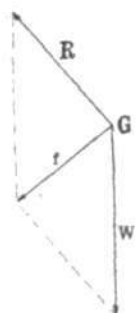


Fig. 4.

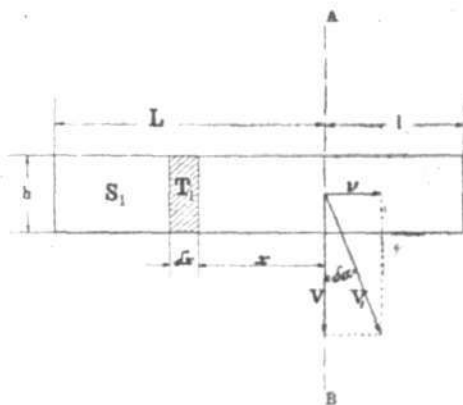


Fig. 5.

necessary for practically assuring lateral stability, if the arrangement adopted for obtaining this variation is sensitive to rolling or to gyration.

One can, in fact, determine a couple of lateral stability with variable surface just as we have determined the couple of longitudinal stability, if by this is understood the stabilising couple obtained by means of enlarging one of the wings, the other, that which receives the gust of wind, remaining unaltered.

The transverse stabilising couple due to the enlargement of the wing that does not receive the gust is counterbalanced by the damping couple due to the span.

Let us calculate the damping couple. The part of the planes that goes down, that which does not receive the gust, s_1 for example (Fig. 5), may be split up into strips T situated at a distance x from the axis of symmetry AB . If ω is the angular velocity of the wing, and assuming that the distance from AB of the axis of rotation may be neglected, one of the strips T_1 takes under the action of the original disturbance a velocity of rotation $v = x\omega$. But this strip has besides a velocity of translation V at the incidence α . The velocities, V and v , combine to give a resultant

V_1 at the incidence $\alpha + \delta\alpha$. The symmetrically opposite strip, T_2 , will meet the air with a velocity, V_2 , at the incidence $\alpha - \delta\alpha$.

Let h be the chord of the wing (Fig. 5). The lifting forces of the strips considered were equal to one another, and equal to $K_{ya} h \delta x V^2$ before the disturbance. After the disturbance these forces have become—

$K_{ya} + \delta\alpha h \delta x V_1^2$ and $K_{ya} - \delta\alpha h \delta x V_2^2$; that is to say:

$$\begin{cases} K_{ya} h \delta x V_1^2 & \text{and} & K_{ya} h \delta x V_2^2 \\ \delta K_{ya} h \delta x V_1^2 & \text{and} & -\delta K_{ya} h \delta x V_2^2 \end{cases}$$

The two first elements of each of these forces are very sensibly equal to one another and equal to the original lifting forces.

The second elements are also sensibly equal, and constitute a couple of leverage x the moment of which may be written:

$$\delta Ca = \delta K_{ya} x h \delta x (v^2 + V^2).$$

The variations of K_{ya} for small angles of attack are practically proportional to the variations of the incidence, or to $\delta\alpha$ say. But we have, when $\delta\alpha$ is very small:

$$\delta\alpha = \frac{v}{V}.$$

We can therefore put:

$$\delta K_{ya} = \frac{v}{V} \times \text{Constant}.$$

We have then:

$$\delta Ca = \frac{Cv}{V} x h \delta x (v^2 + V^2),$$

and, since $v = x\omega$:

$$\begin{aligned} \delta Ca &= \frac{Cx^3}{V} \omega h \delta x (x^2 \omega^2 + V^2) \\ &= \frac{C}{V} \omega h (V^2 x^2 + \omega^2 x^4) \delta x. \end{aligned}$$

Integrating between 0 and l and between 0 and L (l being the length of the wing not enlarged and L that of the enlarged), and regarding ω as a constant, we have:

$$Ca = \frac{Ch\omega}{V} \left[\int_0^l (V^2 x^2 + \omega^2 x^4) \delta x + \int_0^L (V^2 x^2 + \omega^2 x^4) \delta x \right]$$

$$Ca = \frac{Ch\omega}{V} \left[\left| \frac{V^2 x^3}{3} + \frac{\omega^2 x^5}{5} \right|_0^l + \left| \frac{V^2 x^3}{3} + \frac{\omega^2 x^5}{5} \right|_0^L \right]$$

$$Ca = \frac{Ch\omega}{V} \left[\frac{V^2}{3} (L^3 + l^3) + \frac{\omega^2}{5} (L^5 + l^5) \right]$$

Neglecting the term $\omega^2 (L^5 + l^5)$ beside the term $V^2 (L^3 + l^3)$ we have in the end:

$$Ca = \frac{Ch\omega V}{3} (L^3 + l^3);$$

and taking account of the total weight w of the wings, we have at the end of the time t :

$$Ca = \frac{Ch\omega V}{3} (L^3 + l^3) - \frac{w}{4} (L + l) \cos \frac{360 \omega t}{\pi (L + l)}$$

Thus, when a disturbance is produced, the damping couple to which it gives place is, taking into account the growth of one of the wings, proportional to the sum of the cubes of the two lengths of the wings. This couple then is made greater by the lengthening of the wing.

This couple is counterbalanced by the transverse stabilising couple of the enlargement of the wing, which does not receive the gust of wind. This latter couple has for its value:

$$\Gamma = K_{ya} h V^2 \frac{(L^2 - l^2)}{2} - \frac{w}{4} (L + l) \cos \frac{360 \omega t}{\pi (L + l)}$$

To measure the action of the transverse stabilising couple equate this couple to the damping couple and write:

$$K_{ya} h V^2 \frac{(L^2 - l^2)}{2} - \frac{w}{4} (L + l) \cos \frac{360 \omega t}{\pi (L + l)} = \frac{Ch\omega V}{3} (L^3 + l^3) - \frac{w}{4} (L + l) \cos \frac{360 \omega t}{\pi (L + l)}$$

whence:

$$K_{ya} V \frac{(L^2 - l^2)}{2} = \frac{C}{3} (L^3 + l^3) \omega.$$

Let $L = 2l$, $l = 3$, $V = 25$, $K_{ya} = 0.02$, and $C = 1/5$. We find:

$$\omega = \frac{1}{2.5}.$$

These few considerations are without doubt simple enough since they depend on the principle of splitting up the resistance of the air

into elementary resistances. They take account, nevertheless, of the size of the phenomena with an approximation sufficient for the needs of the problem.

The preceding calculation shows that the action of the couple Γ of lateral stability, obtained by means of the automatic enlargement of one of the wings, will generally be sufficient to guard against upsetting. Such an arrangement consequently answers to all the requirements of almost perfectly assured stability.

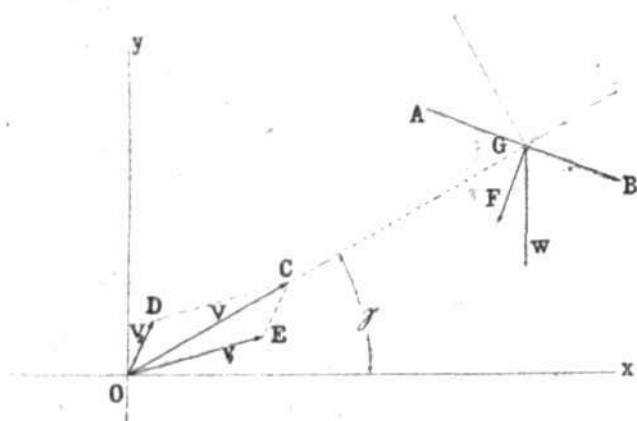


Fig. 6.

Effect on Flying and Hovering with the Engine off.

Variable surface also permits the realisation of flying and remaining stationary in the air with the engine shut off by utilising the ascending currents of air.

Let AB represent the engineless aeroplane, which we will suppose placed facing the wind, of direction OE and velocity V_1 (Fig. 6).

When uniform conditions have been established the aeroplane will follow a trajectory GF, and the wind created by this displacement will be in the direction OD opposite to GF and of velocity $V_2 = GF$. The resultant OC of the two velocities V_1 and V_2 will give in magnitude V and in direction OC the relative wind to which the aeroplane is subjected. All will take place, consequently,

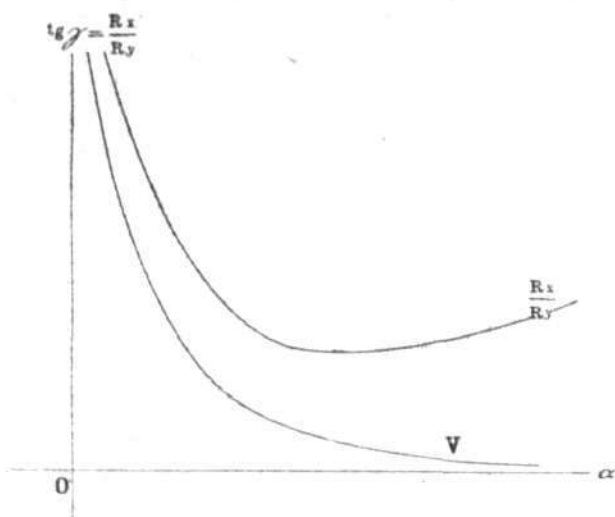


Fig. 7.

as though the aeroplane was descending in *vol plané* following the trajectory OG with velocity V , since in the case of the *vol plané* the relative wind would be equal to V and in the direction OG.

Let us construct for an aeroplane of given surface and for a given altitude the curve of the values of R_x/R_y as a function of α (Fig. 7).

It will be easy then to represent in polar co-ordinates the functions:

$$V = F_1(\gamma);$$

and $\alpha = F_2(\gamma)$;
for each type of aeroplane and for a given altitude.

In Fig. 8 is shown the general trend of the complete curves. An example will suffice to show the way in which the diagram is used.

Suppose that the wind has a direction OE and a velocity V_1 represented by this length. Let us give the aeroplane an angle of attack $OM = \alpha_0$. The imaginary trajectory will be OM, of slope γ , the relative wind $V_{a_0} = OC_0$, and the speed of the aeroplane relative to the ground $V'_0 = C_0E$. In this case the aeroplane will ascend while going backwards. With an angle $\alpha_1 = ON$ the relative velocity would be: $V_{a_1} = OC_1$, the speed of the aeroplane $V'_1 = C_1E$, and the aeroplane would ascend while going forwards.

For $V'_2 = V''_2 = 0$, that is to say, for $V_1 = Va_2$ or $V_1 = \bar{V}a_1$, the point E is on the curve $V = F_1(\gamma)$, and the aeroplane hovers stationary in space.

For $\gamma < \gamma_0$ the hovering becomes impossible. It is apparent from this example that with an aeroplane with fixed surface, for the same angle of attack and with a wind velocity given in direction and magnitude, it is only possible to effect a single operation, ascending and advancing for example.

This is no longer the case if the surface of the machine is variable. The speed $V = F_1(\gamma)$ is represented then by curves such as 1 and 2 (Fig. 9), where S increases from 1 to 2.

The diagram (Fig. 9) shows that the speed of least propulsion OC decreases at the same time as the angle γ .

We know in fact that :

$$\tan \gamma = \frac{R_x}{R_y} = \frac{K_x + \frac{\lambda}{S}}{K_y}$$

will get smaller as the surface is made more considerable in area.

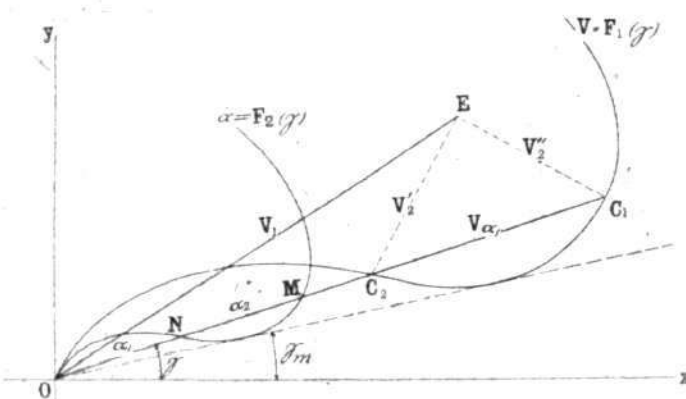


Fig. 8.

Thus, S increases from 1 to 2, γ decreases. Now the speed corresponding to the minimum of γ is:

$$V_0 = \sqrt{\frac{W}{KS a_0}} = \sqrt{\frac{W}{KS}} \sqrt{\frac{4}{\sigma + r a_1^2}}$$

$$V_0 = \sqrt{W} \sqrt{\frac{4}{KS (\lambda + r a_1^2 KS)}}$$

This speed decreases when S increases. It decreases therefore at the same time as γ .

The diagram (Fig. 9) shows again that, for a particular angle γ , when the surface increases the speed $V = F_1(\gamma)$ decreases more rapidly according as the normal speed was made greater.

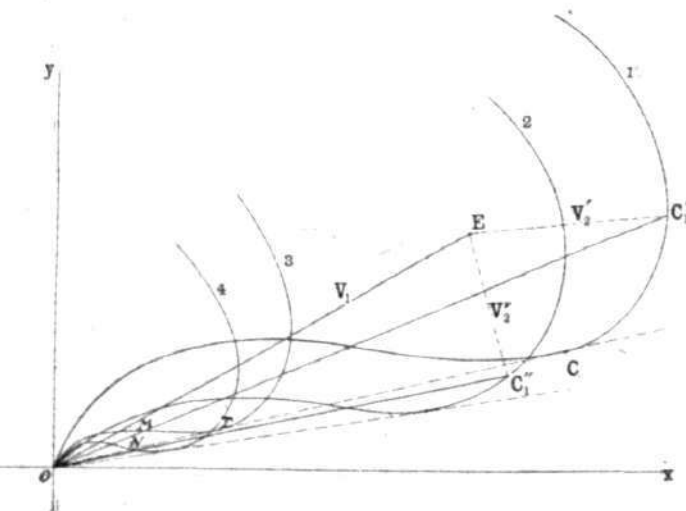


Fig. 9.

The variations of V as a function of S and of γ are in fact given by the relations :

$$\tan \gamma = \frac{Rx}{Ry};$$

$$W = V\mu^2 \sqrt{R_x^2 + R_T^2};$$

where μ is a coefficient that determines the altitude Z and is such that $Z = 18400 \log 1/\mu$.

We obtain from this:

$$\mu R x V^2 = W \sin \gamma$$

$$V^2 = \frac{W}{\mu K x S} \sin \gamma,$$

and, on differentiating:

$$2 V \delta V = - \frac{W}{\mu K x S} \sin \gamma \frac{\delta S}{S};$$

$$\delta V = - \frac{1}{2} \frac{V}{S} \frac{\delta S}{S}.$$

The same results apply to the curves $\alpha = F_2(\gamma)$, represented by 3 and 4 (Fig. 9), where S increases from 3 to 4.

We have, in fact:

$$\alpha_0^2 = \frac{\sigma}{r} + \alpha_1^2$$

$$\alpha_0^2 = \sqrt{\frac{\lambda}{r K S} + \alpha_1^2} = O T^2.$$

α_0 decreases when S increases. The best angle for the aeroplane decreases then at the same time as γ .

We have besides:

$$\alpha = \frac{W}{\mu K S V^2} \cos \gamma$$

$$\delta \alpha = - \frac{W}{\mu K S V^2} \cos \gamma \frac{\delta S}{S} = - \alpha \frac{\delta S}{S}.$$

Thus, for a particular angle γ , when the surface increases, the angle of attack $\alpha = F_2(\gamma)$ decreases more rapidly according as the normal angle of attack was made greater.

This granted, suppose that the wind has a direction OE and a velocity V_1 represented by this length. Give the aeroplane an angle of attack $OM = \alpha_1$. The imaginary trajectory will be OM,

of slope γ , the relative speed $V = OC'$, and the speed of the aeroplane with regard to the ground $V_g = C'E$. In this case the aeroplane will descend while going forwards.

But, as the surface of the machine is variable, we can, with a wind of the same velocity and the same direction, and at the same angle of attack, effect several successive operations.

For example, if the surface is increased from 1 to 2, the angle $\alpha_1 = OM$ (curve 3) comes on to ON (curve 4); OC_1 becomes OC'_1 ; $C_1'E$ becomes $C'_1'E$; V_1 becomes V'_1 , and the aeroplane ascends while going forwards.

Therefore, at the same angle of attack and with a wind given in magnitude and direction the aeroplane can effect with a suitable surface any desired operation, ascending or descending while going forwards or backwards, ascending or descending vertically, going forwards or backwards horizontally, or remaining stationary in the air.

From this we arrive at the following important conclusions:—

- (1) The flying machine can take any minimum gliding angle.
- (2) Hovering in the air is, therefore, assured for any ascending wind whatever its inclination may be.
- (3) For each value of the inclination of the ascending wind there exist two speeds, at which hovering is possible. These two speeds correspond to two particular angles of attack.
- (4) The flying machine can carry out any desired operation of flight or ascent. The wind must obviously be ascending; but it is not necessary for this condition to be fulfilled in an uninterrupted manner; it will suffice, in fact, for this ascendancy of the wind to be periodical for the flying machine to be sustained, since it can increase its lifting surface or decrease it at will.

We may, therefore, hope that very shortly men will know how to utilise the wind in order to economise the precious fuel that they have on board.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

Admiralty, October 3rd.

"A further attack was carried out on the morning of October 2nd by naval aeroplanes upon the enemy airship sheds in the vicinity of Brussels. One of our machines failed to return."

War Office, October 3rd.

"Salonica.—The Royal Flying Corps carried out successful bombing attacks on troops and transports in Prosenik and on a railway train travelling from that place to Seres."

General Headquarters (France), October 3rd, 10.25 p.m.

"The weather has interfered with the work of our aircraft. Yesterday one of our machines was missing."

General Headquarters, October 4th.

"Our aircraft have shown in the highest degree the spirit of the offensive. They have patrolled regularly far behind the enemy's lines, and have fought many battles in the air with hostile machines, and many with enemy troops on the ground."

"For every enemy machine that succeeds in crossing our front it is safe to say that 200 British machines cross the enemy's front. A captured corps report described our aeroplanes as 'surprisingly bold,' and their work has been as conspicuous for its skill and judgment as for its daring."

War Office, October 6th.

"Egypt.—On the same day our aeroplanes carried out a successful bombing attack on enemy camps in the neighbourhood of El Arish. It appears that our recent aerial attacks on the enemy aerodrome at El Arish have had the effect of compelling the enemy to move their machines and hangars from that place."

"Mesopotamia.—On October 1st bombs were dropped by our aeroplanes on the hostile camp at Kut-el-Amara."

Admiralty, October 7th.

"From September 13th to 22nd a series of attacks was carried out by naval aeroplanes operating against the Bulgarian coast."

"On the 13th the Headquarters of the Bulgarian 10th Division at Bademli Chiftlik were attacked with considerable effect. Subsequently these Headquarters were removed elsewhere, but were discovered and attacked three days later, with excellent results. A large explosion was caused, and a fire, which lasted for a considerable time, broke out among the buildings."

"On the 16th considerable damage was caused to transport

proceeding on the road towards Drama, and on the same day the shipping in Foulies Harbour was bombed."

"On the 17th and 18th the rolling-stock, gun emplacements and stores at Drama Station were bombarded and considerable damage done to them."

"On the 19th a column of troops and transport were thoroughly plied with small bombs, which caused considerable damage and confusion."

"On the 21st points of military importance on the Seres-Drama road were attacked."

General Headquarters, October 7th.

"The work of the infantry was, as usual, greatly assisted by our aircraft. In spite of bad weather during the past five days, our aeroplanes have done valuable work and dropped a large number of bombs on the enemy."

General Headquarters, October 8th.

"Yesterday, in spite of difficult weather, our aeroplanes did useful work. One of our machines is missing."

War Office, October 8th.

"Salonica.—Doiran Front. One enemy aeroplane was forced down behind their lines by our airmen."

French.

Paris, October 3rd.

"Yesterday our pilots brought down a German machine, which fell near Condé le Sutry (region of Vouziers). Sergt. Sauvage yesterday brought down his fifth German machine in a brisk fight. The enemy aeroplane crashed to the ground south of Transloy."

Paris, October 4th.

"The bad weather interfered with flying operations on the greater portion of the Front."

Paris, October 5th.

"Despite very bad weather, one of our aeroplanes bombarded the aviation ground at Colmar during a night flight."

"Ninety bombs were dropped on the searchlights and military buildings of the port of Zeebrugge."

Paris, October 6th.

"In spite of unfavourable atmospheric conditions, our machines carried out 29 flights in pursuit of enemy aeroplanes and in reconnoitring and observing for artillery purposes."

"A German aeroplane has been brought down."

Paris, October 7th.

"An enemy squadron dropped 25 bombs on Belfort. Nobody was hurt, and the material damage done was insignificant."

"Yesterday our aircraft carried out a number of flights for purposes of artillery observation and reconnaissance."

"Four fights were fought, in the course of which, in addition to the German machine which was brought down south of Peronne, and which was reported in last night's *communiqué*, an Albatros fell headlong in its own lines south of the Bois de Haudronviller."

"Thirty-four 120 mm. shells were dropped on the new German railway station at Vignieulles."

Paris, October 8th.

"Our aeroplanes have regulated the fire of our guns and located many batteries in action in the Somme area. They fought six air fights, and have bombarded Moislains and the Vaux Wood (north of Peronne)."

Russian.

Petrograd, October 5th.

"The Baltic.—On October 3rd, when a raid of enemy seaplanes took place, one of them landed and was captured by us near the island of Runõ, in the Gulf of Riga."

Petrograd, October 7th.

"In the region of the Zlota Lipa six aerial engagements were fought, in the course of which Sub-Lieut. Orloff and Lieut. Yanchenko chased an enemy aeroplane and fired incendiary bullets at it with success, the enemy aeroplane coming down enveloped in black smoke."

Italian.

Rome, October 8th.

"A few enemy aeroplanes, which were driven away by our artillery, dropped bombs near Asiago Gallio and Fonzaso, but without doing any damage."

Rome, October 9th.

"Hostile aeroplanes dropped bombs on Grigne (Sugana Valley), on the Upper Fella Valley, on the Brado Lagoon, on Monfalcone, Cervignano and Torre Zuino, doing a slight amount of damage to buildings."

Roumanian.

Bucharest, October 8th.

"A squadron of eight German aeroplanes flew over Bucharest at 11 o'clock and dropped bombs in the neighbourhood of the Gare du Nord and on some linen warehouses. The damage was insignificant. The enemy aviators left half-an-hour later."

German.

Berlin, October 4th.

"On the afternoon of October 2nd naval aeroplanes from the aerodrome at Zeebrugge pursued an enemy air squadron."



BRITISH AIR WORK—A FRENCH TRIBUTE.

THE following semi-official account of the work of the British flying officers during the Somme battle was issued in France on October 3rd:—

"Our British Allies are not in the habit of mentioning, as we are, the names of the airmen who, like Guynemer, Nungesser and Navarre, add without ceasing new Boche machines to the total of casualties. They exist, however, and they have to their credit some superb records. One pilot, Capt. Albert Ball, 20 years of age, has brought down 29 German aeroplanes and one Drachen. Like Nungesser, he destroyed three machines in a single morning. Without, however, stopping to consider the individual valour, let us look at the figures of the British Army since July 12th. During the month of July 46 German aeroplanes were brought down, 16 were damaged and disabled, one was brought down by anti-aircraft batteries. During August 18 German machines were destroyed, 38 were brought down more or less damaged, and one was brought down by gunfire. September was still more brilliant. Up to the 27th 50 enemy machines were brought down, 60 were hit under very difficult conditions, one was a victim of anti-aircraft fire, and six Drachens were burnt, making a total of 123 machines destroyed and 114 suffering a more or less disastrous fate. All this occurred in the space of 12 weeks' fight. British raiders have not shown themselves less active, for they have dropped thousands of tons of bombs every day on German territory or on land occupied by the Germans."

"The attack on Libercourt on September 25th deserves special mention, for it was conducted with much skill and audacity. The object was to interrupt traffic on the railway from Lille to Douai. Trains were running south carrying reserves or munitions for the battle of the Somme, and it was decided to attack them. Patrols were first of all sent over the aerodromes in order to hold in check the German airmen who had been able to interfere with the British pilots entrusted

In the course of a fight which developed an enemy aeroplane was shot down. Our machines returned safely."

Berlin, October 5th.

"Our airmen, who had already on the preceding days by successful attacks caused damage to stores, troop camps and railway premises, yesterday dropped numerous bombs, setting fire to the railway station of Rozhishche and buildings on the communication lines in the vicinity."

Berlin, October 6th.

"An airship and some airmen attacked with bombs the railway establishments and troop encampments north of the Danube."

Berlin, October 7th.

"Five enemy aeroplanes were shot down in air fights or by anti-aircraft guns. Capt. Boelke placed his thirtieth opponent *hors de combat*."

Berlin, October 9th.

"The greatest efforts are called for from our airmen on observation duty for our artillery and the airmen covering them. The difficult tasks of the airmen on observation duty can only be carried out if the protecting airmen keep off the enemy airmen."

"An unprecedented number of air fights have taken place and ended successfully for us."

"In September we lost 20 aeroplanes in air fights, and one machine is missing."

"The British and French losses are 97 in air fights, 25 shot down from the ground and seven forced to land in our lines—total 129. About half the enemy's losses were in his own lines and the other half in ours."

Austrian.

Vienna, October 5th.

"On Wednesday a squadron of our seaplanes dropped bombs with very good results on the enemy seaplane station near Grado and on military objectives at Monfalcone, San-canziano and Staranzano. In spite of heavy firing, all our seaplanes returned safely."

Turkish.

Constantinople, October 3rd.

"Egyptian Front.—Three enemy aeroplanes which, on October 2nd, flew over El Arish and attempted to drop bombs, were forced by our fire to beat a retreat. One machine was damaged."

Constantinople, October 5th.

"On September 24th one of our airmen shot down a British machine on the Felahieh front (on the Tigris)."

with the attack. Bombs emitting strong fumes and explosive shells were thrown on the enemy aviation grounds, where great excitement soon prevailed. While this was going on attacking squadrons, with other aeroplanes in attendance crossed the sky, waiting for the opportune moment. The first train was seen to leave Libercourt at 1.40 p.m. The second train was arriving on the line between Henin-Liétard and Ostricourt, where it joins the main line. Capt. C— and his machine gunner, Sergt. J—, descended to about 250 metres (about 800 ft.) over the first train, near Ostricourt, and successfully dropped six bombs. The engine was hit and jumped the rails. Three coaches were telescoped, and the maddened German soldiers got out of the carriages, looked for a way of escape towards Ostricourt, and in the direction of a wood near by. But Capt. C— went still lower, fired on the disorganised crowd, leaving numerous dead and wounded on the ground. The second train then arrived, but the first blocked the junction. Lieut. W— and his gunner carried out a manoeuvre similar to that of Capt. C—. Three bombs fell right on to the train. The German troops were panic-stricken and tried to flee across the fields, but, followed by machine-gun fire, they had a difficult task. No fewer than 100 were killed or wounded in the two trains."

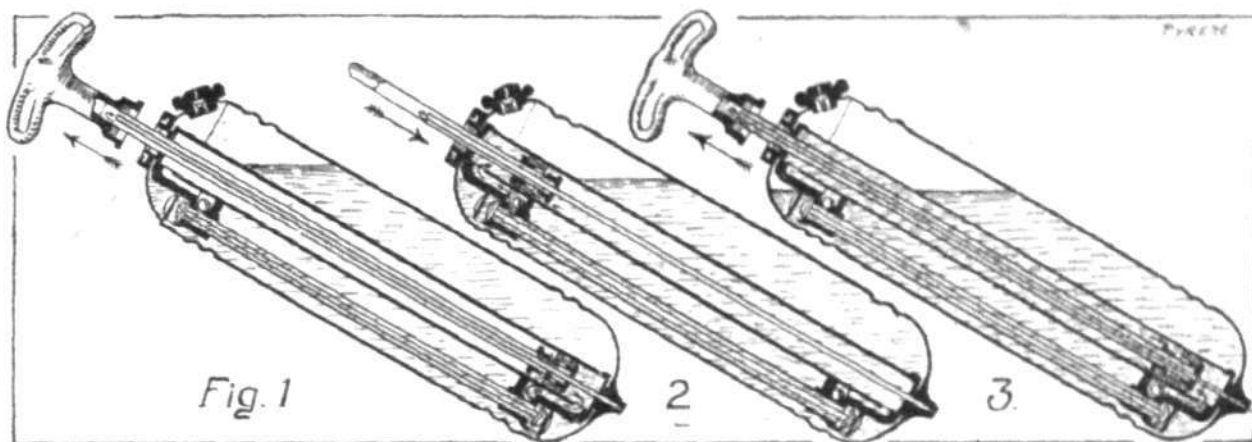
"Attacking aeroplanes went to the station at Libercourt, on which they dropped 14 bombs. The buildings were blown up and the railway destroyed. Several overturned wagons obstructed the way in certain parts. Held in check everywhere by advance patrols, German aeroplanes did not appear. At one point one of these patrols destroyed an air shed, while another, operating over Phalempin, caused a large fire, probably in a petrol store. All the British machines returned safely, after having put an enemy aeroplane to flight which had ventured to approach the scene of their exploits."

THE "PYRENE" FIRE EXTINGUISHER.

FIRES are not infrequently caused by some trivial outbreak, and many hundreds of pounds worth of damage might have been saved had the source of trouble been quelled at the outset. It is essential, however, that such an outbreak be dealt with promptly and effectively. To accomplish this something better than buckets of sand or water and the so-called portable chemical fire extinguishers (so often relied upon) are required, and for such requirements the extinguisher marketed by the Pyrene Co., Ltd., of 19-21, Great

ceases as soon as the operator leaves off pumping, and the remaining liquid is available for further use until exhausted, when the container is recharged with a fresh supply through the filler-cap.

The uses to which an extinguisher such as the "Pyrene" could be put in connection with the aircraft industry are innumerable. Not only can they be carried on aircraft themselves, but they could be conveniently placed to advantage at various parts of an aerodrome—in certain French aerodromes



Diagrammatic views of the "Pyrene" fire extinguisher in section, showing the action of the double-acting pump.

Queen Street, London, has justified its existence on more than one occasion. The Pyrene extinguisher is extremely portable, measuring only 14 ins. in length and 3 ins. diameter, and, what is more important, is very simple and reliable in its operation, being nothing more nor less than a double-acting hand pump contained within its own reservoir of fire-extinguishing liquid. This latter is, perhaps, the principal feature of the Pyrene extinguisher, for it is a *harmless* liquid, consisting of a combination of purely organic materials, and contains neither acid, alkali, salts nor moisture. When directed on to the flames its vapour, being several times heavier than air, clings to the burning object and separates the flames from the atmosphere, thereby extinguishing the fire by smothering it. Petrol, oils, grease, celluloid, tar, acetylene and other inflammable substances are thus easily extinguished with little or no damage to the burning or surrounding objects. Pyrene has the further important advantage of being a non-conductor of electricity, and it can therefore be used with safety and effect in extinguishing electrical fires.

The mechanical action of the extinguisher may readily be gathered from the accompanying diagrams. At each end of the central pump tube are ball valves, and these are connected by an outer tube within which is a rod with a feed cap valve at each end. This rod is longer than the distance between its two valves, so that when the weight of the rod causes the uppermost valve to close on its seat the lower valve is open. The central pump tube, together with the valve gear, is free to move around its own axis, so that no matter in what position the extinguisher is held, the feed valves are always under the pump and at least one is submerged, since they revolve by their own weight, and the liquid is always drawn from the lowest part of the container. When the piston-rod, with its sliding piston-valve, is pulled out on the first stroke (Fig. 1), the liquid is drawn through the lower ball valve. On the return or in-stroke the liquid previously drawn in and filling the pump tube is forced through the piston valve into the hollow piston-rod and through the outlet tube within the latter. The lower ball valve has in the meanwhile closed and the upper one opened, admitting liquid to the upper portion of the pump tube (Fig. 2). On the next out-stroke liquid is again drawn into the lower portion of the pump tube and that contained in the upper portion is forced through the piston-valve as before (Fig. 3). With each further stroke a continual flow of liquid is forced through the outlet tube and nozzle. The flow

mechanics proceeding to meet an in-coming machine always carry a "Pyrene" extinguisher with them—in hangars, and, of course, in the various shops of an aircraft factory. In conclusion, it may be of interest to note that "Pyrene" extinguishers are supplied, amongst many others, to the following: The War Office, Admiralty, the Allied Governments, the Royal Flying Corps, and most of our aircraft and motor manufacturers.

FROM THE BRITISH FLYING GROUNDS.

Grahame-White School, Hendon.

LANDING practice last week: Messrs. Green and Kaizer, Straights with Instructor: Lieut. Hitchcock. R.H. circuits: Messrs. Lord, Norris and Ranson.

Instructors: Messrs. Manton, Winter, Pashley, Biard and Hale.

Tribute from the Enemy.

IN spite of the persistent way in which the German Headquarters *communiqués* lie as to their aircraft losses, the truth will out as to the effective work of the R.F.C. The most striking tribute to hand lately is contained in the memorandum by General Sixt von Arnim, commanding the IVth German Corps, on the experiences of that Corps in the battle of the Somme in July last. He says:—

"The means for providing the artillery with aerial observation has proved insufficient. . . . The numerical superiority of the enemy's airmen and the fact that their machines were better were made disagreeably apparent to us, particularly in their direction of the enemy's artillery fire and in bomb-dropping. . . . The number of our battle-planes was also too small. The enemy's airmen were often able to fire successfully on our troops with machine guns, by descending to a height of a few hundred metres. The German anti-aircraft gun sections could not continue firing at that height without exposing their own troops to serious danger from fragments of shells. This has produced a desire for the anti-aircraft defences to be supplemented by machine guns. A further lesson from this surprisingly bold procedure of the English airmen is that the infantry make too little use of their rifles as a means of driving off aircraft."

He makes a number of recommendations for improving the anti-aircraft establishments, with advice as to the types and number of guns to be used.

SIDE-WINDS.

MESSRS. CHAS. BOSS AND Co. (Liverpool), Ltd., 634, Royal Liver Building, Liverpool, the well-known timber specialists, are receiving at Manchester per "Malvern Grange" a parcel of prime, rift sawn silver spruce, good specification. They have also due to arrive within the next three or four weeks about 200 standards similar stock.

CLIENTS of Mr. William Moss, the "parts specialist" of 52, High Street, New Oxford Street, W.C., should make a note that his telephone number is Gerrard 6731, while telegrams should be addressed to "Airobilimos-Phone." Quite a brain-wave that.

THE great success of the fortnightly list of the Aircraft Supplies Co., Ltd., has necessitated a little alteration in the issuing arrangements. In future it will be published monthly, while it will be kept up-to-date by weekly supplements. It is an invaluable little publication, and if there are any firms who have not applied to have it sent to them regularly they should send along their name at once to the Aircraft Supplies Co., Ltd., 17, John Street, Theobald's Road, London, W.C.

THE steadily increasing demand for their fans and other specialities has necessitated the Buffalo Forge Co. obtaining more commodious offices for their headquarters in London. They are still to remain at Caxton House, Westminster, but in future their location will be on the first floor in the West block of Caxton House.

MESSRS. BROWN BROTHERS', LTD., new list of aircraft accessories shows that they have laid themselves out to supply practically any material, component, fitting, or accessory which may be required in connection with the building or maintenance of aircraft. Every firm in the industry should make a point of getting a copy, which will be sent by return on application to Messrs. Brown Brothers' head offices, 22-34, Great Eastern Street, London, E.C.

THE new edition of the C.A.V. Blue Book of Lighting is in abeyance until the end of the war, but the firm have published an abridged catalogue which gives particulars of their lighting sets, lamps, horns, and other electrical fittings. A most ingenious little fitting, of which details are given, enables the bulb to be correctly focussed in the lamp with very little trouble. Those who are considering the question of electric lighting, whether for aeroplane or motor car work, should drop a line to the C.A.V. Co., Acton, London, W., for a copy of their latest booklet.

LEGAL INTELLIGENCE.

The General Aviation Contractors, Ltd.

ON Wednesday, October 4th, a motion was heard before Mr. Justice Atkin as Vacation Judge in an action brought by Mr. D. L. Santoni against the General Aviation Contractors, Ltd., and another.

Mr. Woodgate (instructed by Messrs. Osborn and Osborn) appeared for the plaintiff; and Mr. G. W. H. Jones (instructed by Mr. F. A. Rudall, of 48, Watling Street, E.C.) appeared for the defendants.

From the affidavits which were read, it appeared that, in pursuance of notices duly given, a resolution had been passed on September 7th for the voluntary liquidation of the defendant company and for the appointment of Mr. W. A. Casson as liquidator. These resolutions were to be confirmed at a meeting called for October 6th, and the object of the action was to obtain a declaration that the original resolution was passed improperly, and for an injunction to restrain its confirmation. The affidavit of the plaintiff Santoni set out that he held a controlling share interest in the company, and that the resolution was passed whilst he was absent in Italy on the company's business.

Mr. G. W. H. Jones proceeded to read the affidavit of Mr. W. Ridley Prentice on behalf of the company, in which it was denied that any irregularity had taken place, when the Judge stopped him and stated that he had read sufficient of the affidavit for the purposes of the motion.

Mr. Jones then stated that the object of the liquidation was to obtain an order of the Court for the examination of the plaintiff Santoni, as allegations were made against him as to the manner in which he had dealt with certain assets of the company in the form of shares in the Societa Anonima

Costruzione Aeronautiche Savoia and Agenzia Generale Forniture Aeronautiche Companies.

Without calling upon counsel for the plaintiff, the Judge said that he would make no order on the motion. The application for the injunction therefore failed.

COMPANY MATTERS.

General Aviation Contractors, Ltd.

AT a meeting of shareholders of the company on Friday, October 6th, a resolution was confirmed to put the General Aviation Contractors, Ltd., into voluntary liquidation, and to appoint Mr. W. A. Casson liquidator.

It was stated at the meeting that an unsuccessful attempt had been made by Mr. D. L. Santoni to obtain an injunction against the company to prevent the passing of the resolution for liquidation.

We understand that all the creditors, of whom there are very few, will be paid in full, and that the principal object of the liquidation is to follow up proceedings against Mr. Santoni in certain actions which have been begun, and the writs for which have already been served on Mr. Santoni during his recent visit to England in connection with the above abortive legal proceedings.

NEW COMPANY REGISTERED.

AIRCRAFT TRANSPORT AND TRAVEL, LTD., 47, Victoria Street, Westminster.—Capital £50,000, in £1 shares (25,000 5 per cent. participating pref.). Manufacturers of and dealers in aeroplanes, balloons, airships, and flying machines of all kinds, motors, &c. First directors, G. H. Thomas (Managing Director) and A. F. Thomas.

IMPORTS AND EXPORTS, 1915-1916.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see "FLIGHT" for January 25th, 1912; for 1912 and 1913, see "FLIGHT" for January 17th, 1914; for 1914, see "FLIGHT" for January 15th, 1915; and for 1915, see "FLIGHT" for January 13th, 1916:—

	Imports.		Exports.		Re-Exportation.	
	1915.	1916.	1915.	1916.	1915.	1916.
January ...	20,382	1,509	435	6,399	13,706	—
February ...	380	6,444	138	30,693	18,823	—
March ...	280	3,388	7,218	17,872	5,090	7
April ...	2,189	3,383	23,986	22,608	275	3,783
May ...	178	1,986	12,530	26,165	8,250	300
June ...	5,469	4,986	3,730	59,287	2,400	—
July ...	1,240	2,072	13,372	12,932	—	—
August ...	664	2,583	36,276	13,555	247	420
September ...	536	1,076	4,908*	36,048	—	—
	31,318	27,427	102,593	216,559	48,791	4,510

* ? should be £14,908.

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